The Meewasin Creek Site (FbNp-9):

A Re-Examination of the Terminal Middle Precontact Period

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Abstract

The Meewasin Creek site (FbNp-9) is a multicomponent precontact site located within the confines of the Wanuskewin Heritage Park, three kilometres north of the city of Saskatoon. The University of Saskatchewan conducted field school excavations as part of a long term study by in conjunction with Wanuskewin Heritage Park. Excavations exposed over 40 m^2 and 10 occupation levels. Cultural affiliations of the buried levels range from the McKean complex in the deeper levels, through Pelican Lake, Sandy Creek, Besant, Avonlea, and indeterminate components. Radiocarbon dates from four levels corroborate the time frame of the occupation levels. Research includes an analysis of artifacts, ecofacts and features from each cultural level to determine how the site was used in each time period.

The Terminal Middle Precontact period is a time of increased cultural complexity on the Northern Plains. This study focuses on the 2500 to 2000 B.P. time frame during which a number of cultural expressions are observed in the archaeological record including Pelican Lake, Sandy Creek, Besant, Plains Woodland, and previously un-named complexes. The archaeological remains recovered from Meewasin Creek are compared to a number of similarly aged sites in the Northern Plains including Mortlach, Sjovold, Walter Felt, as well as the single component Rocky Island site. By comparing the lithic and faunal assemblages at these key sites, we can draw a better view of the cultural systems present on the Northern Plains. From this benchmark we can form a more holistic cultural chronology on the Northern Plains, particularly in central Saskatchewan.

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Chapter 1
Introduction

1.1 Background

Wanuskewin Heritage Park, located approximately 3 km north of the city of Saskatoon, is a unique, culturally rich area designated to preserve one of the largest concentrations of archaeological sites on the Northern Plains. The Meewasin Creek site (FbNp-9) is a deeply stratified, multicomponent archaeological site. The excavation, analysis and interpretation of the site are part of the ongoing research program at the park.

Since the 1930s archaeologists have been aware of the rich cultural deposits in the area. In the subsequent decades sporadic test excavations were conducted by the North Dakota State Historical Society in 1946 and 1952, Thomas Kehoe from the Saskatchewan Museum of Natural History in the early 1960s and 1975, and Zenon Pohorecky with the University of Saskatchewan in 1965 (Walker 1988). The Meewasin Valley Authority commissioned the University of Saskatchewan, directed by Dr. Ernest Walker, to conduct a preliminary survey of the area in 1982 and 1983. At this time 21 sites were discovered. The 19 precontact sites include numerous campsites, kill sites, and a major boulder alignment. Eight sites have since undergone detailed excavation and analysis, coinciding with the long-term, multi-year research project outlined for the area (Walker 1983a). These include FbNp-1 (formerly Tipperary Creek); Meewasin Creek (FbNp-9); Red Tail Creek (FbNp-10); Newo Asiniak (FbNp-16); Amisk (FbNp-17); Cut Arm Creek (FbNp-22); Thundercloud (FbNp-25); and recently, Dog Child (FbNp-24). The sites represent numerous cultural occupations containing artifacts that are diagnostic of most cultural groups noted in the Northern Plains from the Middle and Late Precontact periods.

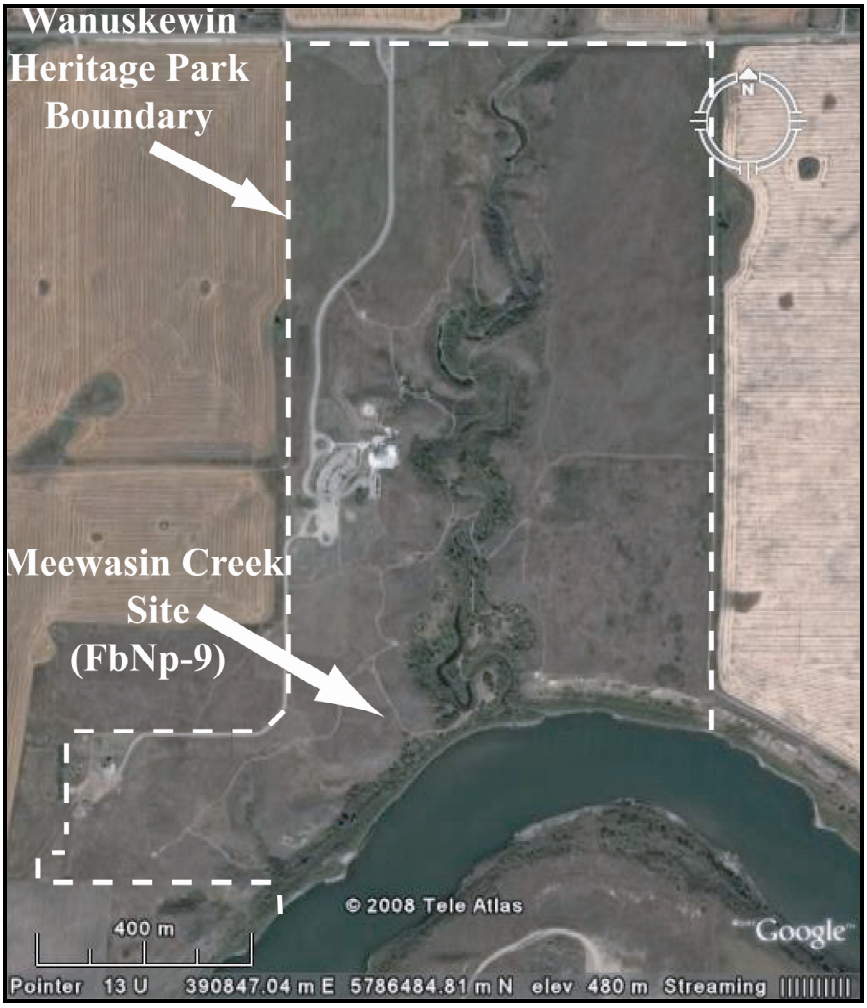

Figure 1.1 Location of Meewasin Creek site in relation to Wanuskewin. (Adapted from *Google Earth*™ www.googlemaps.com 2008)

The Meewasin Creek site (FbNp-9), located in the southwest portion of the park was originally located and tested during the initial survey in 1982 (Figure 1.1). On the basis of these findings, the Meewasin Creek site was deemed appropriate for large-scale, multi-year excavation as a Master's Project in the Department of Archaeology and Anthropology (Walker 1983a:128). Due to the large amount of bone recovered and the presence of complete elements, the west side was determined to be a bison procurement area that may have involved the use of a pound structure, with a processing and associated habitation area located to the east (Walker 1983a:60). Seven distinct occupation levels were revealed, numerous artifacts collected, and features observed and mapped.

1.2 Research Objectives

The research objectives as defined for the Meewasin Creek archaeological project include the following:

- Describe the biophysical environment of the study area.
- Present the methods and techniques used in the excavation and analysis of the site.
- Analyze and describe the artifacts, ecofacts and features recovered from each cultural layer of the excavation block. Tools and other important archaeological remains from the shovel tests and surface will also be discussed.
- Determine the number and types of animals present at the site within each occupation level.
- Identify activity areas within the site and interpret seasonality and subsistence when possible in order to understand what occurred at the site during each occupation and how the site-use changed over time.
- Determine the cultural sequence at Meewasin Creek site by assessing the diagnostic materials and patterns present to identify the cultural groups represented within each cultural level.
- Provide an overview of the Terminal Middle Precontact period in the Northern Plains with an emphasis on Saskatchewan culture history.
- Compare the Terminal Middle Precontact period components at the Meewasin Creek site with other sites in the area, in order to refine the Plains cultural chronology framework.

This study will provide a general framework for the geological and cultural site formation processes at the Meewasin Creek site. It is designed to accompany other research initiatives at Wanuskewin and serve as a basis for future study in the region.

1.3 Organization of Thesis

The format of this thesis begins with a general overview of the region in Chapter 2, describing the biophysical environment of the site area. Chapter 3 provides a brief cultural chronology for the Northern Plains with a particular focus on the Saskatoon region. Chapter 4 discusses the research methodology, excavation techniques, and

analysis process of the artifacts recovered from Meewasin Creek. Chapter 5 describes the stratigraphy and chronology of the site and describes the radiocarbon assays obtained. Chapters 6 through 12 progress through the cultural occupation levels beginning with Cultural Level 1 located near the surface, through Cultural Level 7, 2 m below surface. Multiple levels of buried soil represent distinct occupation levels. Cultural Level 1 (Chapter 6), Cultural Level 2 (Chapter 7) and Cultural Level 3 (Chapter 8) are continuous occupations that span the entire excavation block. Cultural Level 3A (Chapter 9) is a partial level observed only in the eastern portion of the site, separated by relatively culturally sterile sediment above and below. Cultural Level 4 (Chapter 10) and Cultural Level 5 (Chapter 11) both separate into two occupation levels in the eastern portion of the block (4A and 4B; 5A and 5B). Chapter 12 includes a discussion of Cultural Level 6 and Cultural Level 7 as they are both poorly represented in the archaeological record. These cultural level chapters discuss in turn the lithic materials, faunal remains, features, and other artifacts of note, with a discussion of the cultural implications for each level. Chapter 13 compares the Meewasin Creek site Terminal Middle Precontact period occupation levels to other Northern Plains sites, and thus, defines a pattern for the Terminal Middle Precontact period. Chapter 14 summarizes the Meewasin Creek site in the context of the Terminal Middle Precontact and discussed future research objectives.

Chapter 2
Biophysical Environment

2.1 Site Location

The study area is defined as within the Great Plains physiographic region that extends over a large portion of central North America. The plains are bordered by the Rocky Mountains to the west; and extend northward to the boreal forests of Alberta, Saskatchewan, and western Manitoba, eastward to the woodlands of western Minnesota, Iowa, and Missouri, and southward into northern Texas. The Meewasin Creek site is located centrally within the northern extent of the Northern Plains. The Northern Plains culture area can be divided into the Northwestern Plains in Alberta, western Saskatchewan and Montana. The Northeastern Plains extends across eastern Saskatchewan, Manitoba, the Dakotas and Minnesota. The general geographic culture areas are convenient when defining cultural patterns, although the margins are blurred, not conforming to current political boundaries.

The Meewasin Creek site is located at 52° 13' N Latitude and 106° 35' W Longitude; 13U 390920 E 5786270 N (NAD 27). The site is within a deep drainage basin on the western shore of the South Saskatchewan River (Figure 2.1). An intermittent drainage flows through the floor of the basin to the east of the site and joins the river to the southeast. The site was initially formed by glaciofluvial erosion and is presently affected by ongoing colluvial and alluvial processes.

2.2 Paleoenvironmental Reconstruction

During the terminal Pleistocene, the retreating Wisconsin glacier made way for the slow movement of vegetation northward in much the same pattern as today: tundra, boreal forest, parkland, and prairie. The climate was cooler and wetter than it is today and large mammals such as mammoths, horses, camels, pronghorn, and *Bison antiquus*, the precursor to modern bison, dominated the terrain.

Figure 2.1 Meewasin Creek site overview facing east (June, 2000).

Beginning 10,500 years ago, the climate rapidly became warmer and drier. The coniferous forests advanced northward, replaced by parkland and grasslands. Many of the large mammals could not survive the climate shift and became extinct. Bison adapted well to the changing environment by diminishing in size and becoming more gregarious. With little competition they expanded their range across the plains.

The mid-Holocene was an interval of increased temperature and aridity occurring between 9000 B.P. and 4400 B.P. (Vreeken 1994), reaching its peak temperature and aridity approximately between 7500 and 4700 B.P. (Wolfe *et al*. 2006). During this time droughts were both frequent and severe (Vance *et al.* 1992). Lakes dried up or became saline (Vance *et al.* 1992) and aeolian activity increased (Wolfe *et al*. 2006). Although the general trend was toward a warmer, drier climate, evidence suggests that there were regional and seasonal episodes of satisfactory moisture conditions, resulting in a fluctuating availability of resources (Vance *et al.* 1992).

Following the mid-Holocene climatic optimum there was a return to environmental conditions similar to today. Climate is dependent upon many factors including air mass movements and the amount of solar insulation and so it does not change uniformly across North America. Within the Canadian plains, the onset of a cooling, moister

climate began earlier in southern Alberta (*ca*. 6000 – 5000 B.P.) than in southern Manitoba (*ca*. 4000 – 3000 B.P.) (Vance *et al.* 1995). Moister conditions coincided with rising lake levels in southern Saskatchewan from 6000 to 4400 B.P. (Vance et. al 1992). Glaciers in the Rocky Mountains advanced below modern levels between 3100 and 2500 B.P. (Scuderi 2002:93). From 3000 B.P. to 2000 B.P. optimal climatic conditions led to increased carrying capacity on the plains. Lake levels were at their highest in the Canadian prairies and prolonged soil formation in dune environments suggests a stable, moist environment conducive for vegetation growth (Wolfe *et al.* 2007). The modern climate has remained approximately the same for the past 2000 years, yet still subject to fluctuations.

2.3 Geophysical Processes

The topography of Saskatchewan is largely due to the effects of the Late Wisconsin deglaciation. The Laurentide Ice Sheet sheared the pre-glacial landscape depositing unique geological features such as eskers, moraines, drumlins, and a thick, discontinuous layer of till across the prairies. The glacier began to retreat from southern Saskatchewan by 17,000 years ago and by 11,500 B.P. the Saskatoon region was ice-free (Simpson 1999:85). As the ice sheet melted, vast quantities of water ponded along the margin of the glacier forming Glacial Lake Saskatchewan over what is now Saskatoon. Sediment was deposited in the glacial lakes via extensive drainage networks producing wide, level plains such as the Saskatoon Plain Ecodistrict (Acton *et al.* 1998). By 10,400 B.P. the glacier had retreated and Glacial Lake Saskatchewan had drained northward into Glacial Lake Agassiz, carving the wide spillways that are present today across much of Saskatchewan, and through which the South Saskatchewan River flows today (Fung 1999). The glacier continued to retreat northward finally clearing from Saskatchewan entirely by 8000 B.P.

The Meewasin Creek drainage basin was formed subsequent to the drainage of Glacial Lake Saskatchewan. Burt (1997) suggests that the drop in base level caused the South Saskatchewan River to incise the present channel, and consequently, the Opimihaw Creek and other tributaries followed suit. The cool, moist, post-glacial climate was conducive to erosion. Within the study area a thin veneer of glaciolacustrine

sediment overlay more compact till sediment. The upper sediment erodes more easily, inevitably carving into the till below. Burt (1997:170) writes, "gullying has been active throughout the history of the [Opimihaw] valley." Based on Burt's (1997) tests at the Redtail site, located in a similar valley west of Meewasin Creek, incision of the gullies began before 5,000 B.P.

The sediment at Meewasin Creek indicates that they were deposited by hillslope erosion (Rutherford 2004:68). Rutherford (2004) determined the dominant geophysical processes at Meewasin Creek include colluviation and debris flow on the lower portion of the site. A debris flow is a mixture of poorly sorted sediment that may be graded normally (sediment fines upward) or inversely graded (sediment coarsens upward) depending on energy of the flow and parent material.

Climate changes influence deposition patterns. In an arid climate, less vegetation develops. As the climate changes toward a wetter environment, heavy rains cause greater overland flow and slope wash. A moister climate promotes vegetation growth, which stabilizes slopes with their root system and leads to the development of soils (Rutherford 2004). At Meewasin Creek the buried soil levels are well defined which indicates periods of slope stability. A cyclical pattern of deposition and stability is evident in the profile which relates to environmental changes occurring in Saskatchewan over the past 5000 years.

Rutherford (2004) correlates soil facies at Wanuskewin with known cultural levels using diagnostic archaeological artifacts and radiocarbon dates to date the depositional patterns. She noted frequent hillslope events occurring between 4500 and 3500 B.P. There is both a reduction of slope activity through time as well as a transition to lower energy hillslope processes. This coincides with climate fluctuations as periods of wetter seasons follow increasingly fewer droughts. By 2000 B.P. there is an increase in soil development and thus slope stability which reflects consistently moister conditions and increased vegetation cover.

2.4 Soils

The Saskatoon Plain landscape is characterized by a gently undulating glacio-lacustrine till plain extending north and west of the city (Acton *et al.* 1998). Dark Brown

Chernozemic soils are common in the Saskatoon region, characterized by a dark brown A Horizon, a lighter brown B Horizon, and a light greyish C Horizon, often with lime carbonate (Saskatchewan Land Resource Centre 1999). Soil sediment ranges from sandy to clayey loam. However, buried soils in Wanuskewin Heritage Park are not necessarily Dark Brown Chernozems (Rutherford 2004). Soils in the valley bottom are generally more developed than on the uplands, and may not be present on actively eroding slopes. Slope wash plays a major factor in sediment deposition at the Meewasin Creek site. The soils within the site are influenced by many local factors that cause variation across the site such as erosional factors, climate, slope, elevation, aspect, vegetation, parent material, drainage, and the floral and faunal organisms living in the soil.

2.5 Climate

The current climate of the Saskatoon region is a sub-humid continental climate, characterized by short, warm summers, and long, cold winters, with little precipitation throughout the year (Acton *et al.* 1998). According to Thornthwaite's (1948) classification system, Saskatoon is in a semi-arid moisture region (Fung 1999:97). The annual precipitation is 360 mm with 30 per cent or 106 cm from snowfall (Fung 1999:100). The growing season is approximately 183 days (Fung 1999:12). The average annual temperature is 2.0° C. The average temperature in January ranges from –22.9° C minimum to –12.3° C maximum; July ranges from 11.6° C minimum to 25.3° C maximum (Fung 1999:100).

The prevailing wind direction is from the west-northwest throughout most of the year, except from March to May, when the jet stream dips far to the south and the wind blows from the south-southeast (Lundqvist 1999:115). The region is susceptible to extreme weather conditions such as severe thunderstorms and tornadoes in the summer and blizzards in the winter.

2.6 Flora

Wanuskewin is located in the southern margin of the Aspen Parkland vegetation region (Figure 2.3), a transitional zone between the boreal forest to the north and mixed prairie to the south (Thorpe 1999). The vegetation is comprised of open fescue

grasslands interspersed with groves of trembling aspen in moister hollows or on north-facing slopes. The ratio of wooded areas to grassland increases northwards, coinciding with higher moisture content in the soils due to greater precipitation and less evapotranspiration (Thorpe 1999). Historical records suggest that the aspen cover is greater now than 100 years ago when people practiced controlled burning to maintain open grasslands (Thorpe 1999).

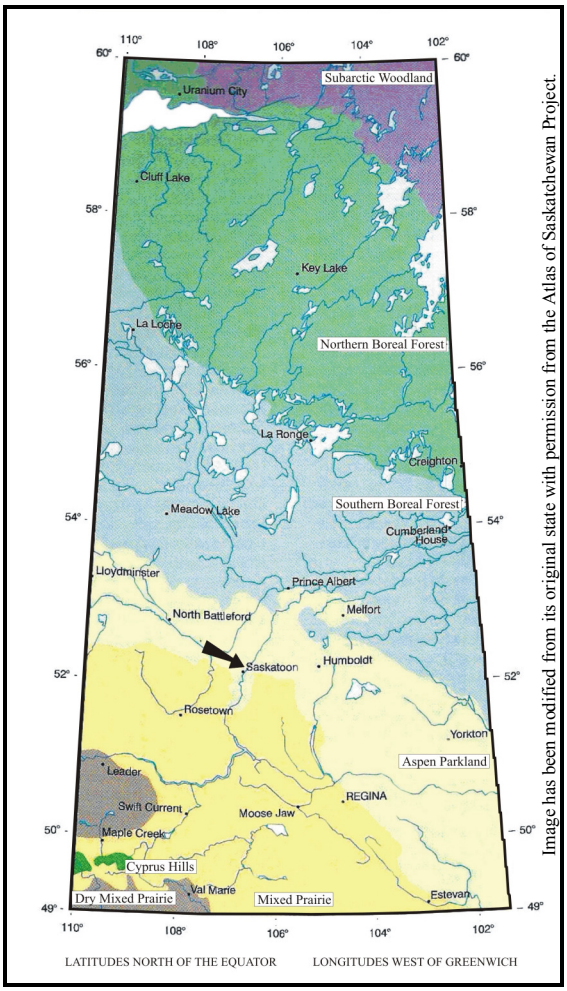

Figure 2.2 Location of Meewasin Site in Relation to the Vegetation Regions of Saskatchewan. Adapted from Fung (1999:133). Original image courtesy of the Atlas of Saskatchewan Project.

The uplands and south-facing slopes at Wanuskewin are influenced by vegetation common to the Mixed Prairie. As well as rough fescue, the grasslands support mid-grasses such as western porcupine grass, june grass, and wheatgrasses, as well as short

grasses such as blue gramma grass (Acton el al. 1998). Tree species are predominantly trembling aspen, however, occasional hardwoods such as green ash, prairie cottonwood, poplar, and American elm and are found along the South Saskatchewan River (Thorpe 1999). Shrubbery, found in depressions or along the margin of aspen stands, includes saskatoon, chokecherry, wild rose, western snowberry and wolf willow (Thorpe 1999). A variety of herbs, grasses and sedge intermingle with the shrubbery. The riparian environments support marsh plants such as cattails and rushes.

2.7 Fauna

The fauna living on the prairies prior to European settlement was vastly different than today. Large herds of bison extended across the plains by the million, yet by the mid-1880s all but a few had been slaughtered for their hides or for sport. Bison lived in the open plain, but during the winter, they migrated into more protected areas such as river valleys, wooded groves, foraging on leaves and shrubs when necessary, or remained in the prairies protected by sand dunes, eating the taller grasses (Epp 1991). As such a prominent and ubiquitous mammal on the plains, they played an important role in the way of life for Plains-adapted populations. Bison meat and marrow provided food, hides provided clothing and shelter, and bones were used for tools and ornaments. A strong reliance on bison influenced religious beliefs and social organization.

Herds of elk and pronghorn, once common to the Northern Plains, were forced to shift their range as settlers pushed them out. The elk moved northwards into the shelter of the boreal forest while the pronghorn moved farther south and west into the more arid plains (Wapple 1999:141-142). Other extirpated species include the grizzly bear, grey wolf, and river otter. The fur trade greatly diminished beaver, mink, and other fur-bearing animals across Canada. Mule deer and the occasional moose are the only remaining indigenous ungulates still present within the study area. White-tailed deer have encroached upon the region since extensive human settlement. Transient species in the Wanuskewin area include the black bear, mountain lion and lynx.

The riparian environment along the South Saskatchewan River and Opimihaw Creek attract a variety of smaller fauna. Common carnivore species include coyote, badger, and skunk, and sporadically, red fox, mink and badger. Leporids present in the area include

snowshoe hares, white-tailed jackrabbits, and rarely, Nuttall's cottontail. The snowshoe hare prefers dense aspen groves whereas the white-tailed jackrabbits are seen on the open prairie and the fringes of aspen bluffs. The range for Nuttall's cottontail is generally in southwestern of Saskatchewan. Common smaller animals are rodents such as beaver, muskrat, Richardson's and Franklin's ground squirrels, northern pocket gopher, mice and voles. A number of reptiles and amphibians are present in the study area due to the close association with the river which also supports a variety of fish species.

The Saskatoon region is on the path of a major flyway for many bird species. The mixed forests and marshlands attract a diverse array of birds. There have been 414 bird species recorded in Saskatchewan varying from birds of prey to songbirds as well as numerous ducks and geese (Smith 1999).

Chapter 3
Cultural Chronology

3.1 Culture History

The archaeological record shows a long history of people living on the Northern Plains – hunting, gathering, trading, and maintaining social networks within a relatively mobile lifestyle. The cultural history of the Northern Plains is based on the cumulative work of many archaeologists using diagnostic artifacts and features, stratigraphy and chronometric dating techniques and is continuously modified as new artifacts and sites are discovered and interpreted. Although there may never be a definitive outline, it is necessary to continue to add to the current repertoire of site studies in order to establish a collective knowledge of the Northern Plains culture history. One of the objectives of this thesis is to place the Meewasin site within the larger chronological framework of the Northern Plains, particularly within the framework defined within Saskatchewan.

In order to describe the culture history of the Northern Plains and specifically the localized region of the Wanuskewin Heritage Park, it is first important to define a number of terms. An *archaeological culture* is used to define a group of sites with related artifacts within a defined geographic area and within specific temporal constraints. Archaeologists look at the material remains in order to infer the cultural constructs of a group of people that share a similar lifestyle relating to their activities, technologies, and presumably, ideologies. Projectile points have been used as diagnostic markers because they are relatively common across the continent, have measurable qualitative and quantitative traits that can be documented and compared, and evolve over time and space as new technologies are developed and transported.

Willey and Phillips (1958) first developed archaeological terminology for defining cultures. A *component*, which represents a single occupation within a site, is the smallest taxonomic unit. A *series* is a rudimentary sequence of components that demonstrate progressive change over time and within a set spatial area (Dyck 1983). A *phase* is a

group of components with similar attributes that are related spatially and exist for a limited period of time. A phase is used by Reeves (1983) when there is a demonstrated a link between preceding and following cultural groups. Phases may be further subdivided into *subphases*, or *varieties* in order to refine differing attributes within the broader phase designation. To associate the terminology in terms of a population, a component is a community, whereas a phase is the society as a whole. The term *complex* is used in this thesis as a specific defined culture, regardless of the placement within a sequence, to describe an assemblage of sites, artifact types, and cultural traits that are related spatially and temporally to a region based on similarities in form and functional traits. Broader classifications include traditions and horizons. A *tradition* is represented by the continuation of a specific technology or cultural modification over a longer period of time. A *horizon* is the expansion of a technology or cultural trait over a large area, yet within a relatively short amount of time.

The first archaeologist to establish a cultural sequence on the Plains was Mulloy (1958). His version of the past held the outdated belief that much of the Plains were vacated during the Altithermal period (7500-5000 B.P.). However, it did provide a basic outline which was modified by many archaeologists as more information became available (see also Wedel 1961, Wormington and Forbis 1968, Frison 1978, and Dyck 1983, and Reeves 1983). The chronologic sequence used in this thesis follows Cyr (2006), which is based on Walker (1992), which incorporates elements from previously developed chronologies, yet uses more culturally sensitive terminology (Scribe 1997).

Precontact occupation of the Northern Plains is divided into three periods: (1) the Early Precontact or Paleo-Indian period which lasted from 10,500 to 7500 years ago; (2) the Middle Precontact period from 7500 to 2000 B.P. which can be further subdivided into Initial (Early), Middle and Terminal (Late) segments; and (3) the Late Precontact period from 2000 B.P. until the time of contact. These periods correspond with dominant projectile point technologies. Early Precontact people utilized the spear to hunt the large game of the terminal Pleistocene and early Holocene. The Middle Precontact period was dominated by the atlatl dart, while the introduction of the bow and arrow on the plains approximately coincides with the beginning of the Late Precontact. Initial

Table 3.1 Geological, Cultural and Climatic Periods.

Years B.P.	Geological Periods	Cultural Periods		Climatic Periods
	Late Holocene	Contact/Protocontact		NEO-BOREAL: colder, moister
		Late Precontact		PACIFIC: drier
1000				NEO-ATLANTIC: warmer, moister
				SCANDIC: warmer, drier
2000		Middle Precontact	Late/ Terminal	SUB-ATLANTIC: cooler, moister, winters stormier
3000				
			Middle	SUB-BOREAL: cooling to modern by end of period. grasslands contract, forests shift southward
4000				
5000			Early/ Initial	ATLANTIC: warmer, drier maximum grassland expansion
	Mid-Holocene			
6000				
7000	Early Holocene			
8000		Early Precontact		
9000				BOREAL: warmer summers colder winters, strong westerlies
10000				PRE-BOREAL: spruce replaced by grassland (Pleistocene megafauna extinct)
11000	Pleistocene			LATE GLACIAL: summers cooler, winters warmer, drier
12000				

3.2 Early Precontact Period

The oldest technological complex in Saskatchewan is the Clovis complex, defined by the large, fluted lanceolate spear points used to hunt the big game of the terminal Pleistocene. As the ice sheet slowly melted from Saskatchewan, the range of the now extinct megafauna including mammoth, horse and camel expanded farther north, and people using Clovis technology likely moved northward as well. Radiocarbon analyses from Clovis sites in the United States indicate occupation between 11,200 and 10,900 years ago (Walker 1999:25). Clovis points have been found on the surface in Saskatchewan.

The Goshen-Plainview complex refers to lanceolate points that are distinctive, un-fluted spear points believed to represent a contemporaneous complex with Clovis. Points have only been found in secondary context in Saskatchewan. Excavated sites in the Central Plains have obtained radiocarbon dates between 13,000 and 11,000 B.P. (Walker 1999:25).

Folsom-Midland cultural assemblages (11,000 to 10,500 years ago) represent a subsistence pattern predominantly focussed toward bison, although archaeological remains in sites to the south indicate a diverse variety of game was selected as well (Walker 1999). Folsom points resemble Clovis, but the flute extends along the length of the point. Midland points are similar, but are not fluted. Several Folsom points have been found in Saskatchewan, but no intact deposits have been recovered as of yet.

Agate Basin (10,500 to 9,500 B.P.), and the contemporaneous Hell Gap points (10,000 to 9,500 B.P.) are long spear points, but the hafting method involves a constricted base. Hell Gap points are similar to Agate Basin, but have a more pronounced shoulder and a wider base. A number of Agate Basin and Hell Gap points have been found in southern and central Saskatchewan.

Approximately 9,500 years ago, people began to manufacture a variety of long, stemmed points, classified together as the Cody complex. These include Alberta points (9,500 to 9,000 B.P.) which have a narrow base, Scottsbluff (8,800 to 8,400 B.P) which are wide with a square base, and Eden points (8,800 to 8,400 B.P) which are narrow with a square base (Walker 1999). The Cody knife is associated with the three styles, and is an asymmetrical, stemmed cutting tool. Cody complex points have been found throughout southern and central Saskatchewan (Meyer 1999). Eden and Scottsbluff points have been found within intact deposits at both the Niska site (Meyer 1985) and the Heron Eden site (Corbeil 1995) in southern Saskatchewan.

The latter part of the Early Precontact period includes an array of various lanceolate tool technologies including Angostura, Fredrick, James Allen, Lovell Constricted, Lusk, and Prior Stemmed. These are grouped together as a Terminal Paleo-Indian sequence, which has radiocarbon dates that range from 8,800 to 7,500 B.P. (Walker 1999). Angostura points have been found as far north as the Churchill River (Meyer 1999)

3.3 Middle Precontact Period

The beginning of the Middle Precontact period corresponds with the onset of the mid-Holocene or Altithermal, a time of increased temperature and aridity. This period represents a shift toward a broader subsistence base rather than a dependence on bison as resources became less reliable. The hunting practices changed at this time as indicated by the change in lithic technology. Projectile points recovered from this time period were thrown with the assistance of an atlatl which improved the range and force of a throwing spear (Epp 1991). The smaller dart points were often notched as a means of hafting the point to a wooden shaft.

The Mummy Cave series includes several varieties of dart points dating from about 7,500 to 5,000 years ago. Mummy Cave is the oldest culture represented at Wanuskewin. Diagnostics were found at the Dog Child site (FbNp-24) in Level 3a and 3b (Cyr 2006). Other sites in the park such as Amisk (FbNp-17) (Amundson 1986) and Redtail (FbNp-10) (Ramsay 1993) sites produced radiocarbon dates in occupation levels corresponding with the Mummy Cave series time span.

The Oxbow complex emerged about 4700 B.P., noted by the distinctive point style with rounded, “eared” basal corners (Dyck 1983). The Oxbow toolkit includes a variety of endscrapers, bifaces, projectile points and blanks. Numerous quantities of Oxbow points across the Plains suggest a population increase at this time corresponding with a shift back towards a moister, cooler climate (Epp 1991). The Oxbow complex was evident on the Plains until about 3800 B.P. (Walker 1999). Within Wanuskewin, Oxbow occupations are found at the Amisk site (FbNp-17), Cut Arm (FbNp-22), Dog Child (FbNp-24), and Thundercloud (FbNp-25) sites.

Coinciding with Oxbow from 4150 to 3100 B.P. is the McKean series comprised of Duncan, Hanna, and McKean dart points. Duncan points are stemmed, Hanna points have shallow notches, and McKean points are more lanceolate in form and without notches. Multiple occupations of all three components in the series occur at the Redtail (FbNp-10) (Ramsay 1993), Dog Child (FbNp-24) (Cyr 2006) and Thundercloud (FbNp-25) (Mack 2000) sites. As well, a Duncan point was recovered from Level 5B of the Meewasin Creek site.

Indications that plant resources became more important in the diet during the Middle Precontact are evident in the archaeological record. Hammerstones and mauls comprised a portion of the tool assemblage which can be used for plant processing, or smashing of bison longbones to retrieve the rich marrow inside. Middle Precontact people became more storage-oriented, developing pemmican, a protein-rich source of essential nutrients in a lightweight, portable form.

The Pelican Lake complex appears throughout the Terminal Middle Precontact, dating from 3300 to 1850 B.P. (Dyck 1983). These corner-notched points are widespread across the plains. There are two types of Pelican Lake points: Pelican Lake I variety, found at sites dating from 3300 to 2800 B.P., is the classic triangular point with deep corner notches and a straight base, whereas Pelican Lake II, dating 2800 to 1850 B.P. is a more variable point, often less well made, and may reflect early bow and arrow technology (Dyck 1983). Pelican Lake sites in Saskatchewan include campsites, bison pounds, cairns, and secondary burials.

During the latter part of the part of the period, more diverse point styles emerged. The Sandy Creek complex appears across the Northern Plains from 2750 to 2150 B.P. (Morlan 1988:306). These small "eared" points resemble the earlier Oxbow points, yet are found in association with much later occupations. At the same time, (*ca*. 2500 B.P.) other projectile points appear at sites on the Northern Plains represented by medium-sized lanceolate side-notched points with straight to convex bases. The cultural complexities of the Terminal Middle period will be discussed in greater detail in Chapter 13.

3.4 Late Precontact Period

The Late Precontact period spans from approximately 2000 years ago until European contact introduced goods and ideologies that brought considerable change to the Plains way of life. A number of technological changes occurred during this period; the most important of these were the introduction of the bow and arrow and pottery.

Pottery first appeared in Saskatchewan approximately 2000 years ago at Besant sites and changed the capacity for storage and cooking. This crude, conoidal earthenware was made of grit and sand temper and was formed using the paddle and anvil. The exterior is

plain or cord marked and a common decoration is a single row of punctuates around the rim (Dyck 1983). It is believed that pottery was introduced to the Northern Plains by interaction with Woodland peoples from the east (Meyer and Walde 2009, Norris 2007).

The second major technological invention of the Late Precontact period was the bow and arrow, likely introduced to the plains during the later Pelican Lake cultural expression. Although the points are much smaller in size, the force and accuracy of the bow proved highly effective. Despite the thick hair, the hide of the bison is quite thin, which can be penetrated easily with an arrow. The small Samantha points may represent Besant arrow points, but a typical Besant point is likely a dart point. Earlier candidates for arrow points have been proposed and are discussed in Chapter 13.

The origin of Besant, discussed in more detail in Chapter 13, is believed to have developed within the Terminal Middle Precontact and lasted until 1150 B.P. (Dyck 1983:113). During this time Besant people are best known for utilizing and improving the use of pounds and jumps, employing an almost industrial strategy toward hunting bison. These would have required the organization of large groups of people, indicating a complex social structure. Lithic collections from Besant components indicate a reliance on Knife River flint and other brown siliceous material, as well as exotic materials to make points and tools. Knife River flint was extensively quarried in northwestern North Dakota, which implies a widespread trade network between North Dakota and Saskatchewan, Manitoba, and farther into Alberta. The Sonota complex is a mound building variant of Besant recognized by a high percentage of Knife River flint (80-90% of the lithic assemblage) and other exotic materials at kill sites, burials and associated campsites.

The Avonlea complex has been identified as a horizon (Kehoe and McCorquodale 1961, Meyer and Walde 2009), a widespread culture recognized throughout the plains often at large bison kill sites and smaller campsites. Avonlea is contemporaneous with Besant in the Northern Plains, although it is arguable that Avonlea follows Besant within individual components (Cloutier 2004). Radiocarbon dates from Avonlea sites are dated to approximately 1700 to 750 B.P. (Morlan 1988: 305-306). Associated with the Avonlea complex are thin, carefully flaked arrowheads, as well as three kinds of conoidal shaped pottery: net/fabric impressed, spiral grooved, and a smoothed version.

Rock Lake Net/Fabric Impressed Ware originated in northern and central Minnesota with the Early to Middle Woodland period Brainerd phase, and subsequently spread into southern Manitoba, Saskatchewan, and Alberta sites with progressively later dates, primarily within the parkland region (Meyer and Walde 2009:54-59). The exterior surface of the vessels is textured with a fabric or net appearance and additional decoration around the rim includes a single row of punctates or bosses or finger pinches, and often with tool impressions on the lip. Truman Parallel Grooved Ware overlaps with Rock Lake Ware spatially and temporally, but is observed more often within Plains sites (Meyer and Walde 2009:59-62). The surface texture is a series of spiral grooves embedded throughout the vessel. Additional decoration is rare. Avonlea Plain Ware is a plain-surface version sometimes found at sites in association with both Rock Lake and Truman Wares (Meyer and Walde 2009:63-64).

Ethridge Ware, generally associated with the Old Women's phase, made an early appearance toward the end of the Avonlea horizon (Meyer and Walde 2009:62-63). This variety has a defined shoulder and neck and a round or flat bottom. The surface texture is cord roughened or smooth with variable decoration. The associated small Prairie Side-notched points, found in sites dating from 1200 to 550 years B.P., are triangular in shape with side notches that are often irregular and set close to the base (Walker 1999).

Plains Side-notched points appear in Saskatchewan by 550 B.P. and persist until approximately 170 B.P. (Dyck 1983:126-135). These small arrowheads are more carefully made, with notches set high on the square base (Epp 1991). Plains Side-notched points are generally associated with the Mortlach phase. Mortlach pottery is variable with smoothed fabric-impressed or check-stamped pottery with cord wrapped tool, dentate-stamped, or other decoration, suggestive of Woodland influences from the east and Selkirk influences from the north (Malainey 1991, Walde 2003, Mokelki 2007).

3.5 Contact Period

Contact refers to the arrival of people from outside of North America, primarily of European ancestry, who brought with them goods that are distinct in the archaeological record. Protocontact refers to the transitional period approximately 400 to 200 years ago, after Europeans first reached the continent, but before their widespread arrival in

Saskatchewan. During this time traditional lifestyles on the Northern Plains were beginning to change with the introduction of European commodities such as horses, guns, and trade goods that reached the Northern Plains by trade or were carried by explorers. Protocontact goods appearing in the archaeological record include glass beads, metal pots, knives and trade points, and other materials of European origin. Protocontact pottery styles evolved, exhibiting more complex decorations and varied rim and neck types.

The Contact period refers to the time when Europeans moved and settled on the Plains bringing their goods and ideologies with them including trading and farming practices. This time period covers approximately the last 200 years for which there are ethnologies and limited written accounts about the area by fur traders, missionaries, artists, and explorers. Settlers began arriving on the plains and settled in Saskatchewan by the mid to late 1800s and in the Wanuskewin area in 1903. The use of flaked stone tools dwindled and eventually disappeared with the introduction of European tools and guns. Although the Meewasin Creek site itself was not disturbed by cultivation or habitation, it likely continued as a locale for rich game resources such as deer and small animals.

Chapter 4
Research Methodology

4.1 Site Discovery and Initial Assessment

The Meewasin Creek site was originally located during the initial park survey and assessment in the early 1980s. This early survey defined the site boundaries through surface reconnaissance, test pits and a profile trench (see Walker 1983a:58-74). The natural basin in which the site is situated suggests a potential occupation area measuring 180 m in a north-south direction and 140 m in an east-west direction. At this time, it was determined that the site consisted of a western kill area measuring approximately 22 by 32 m, and an eastern habitation area separated by a slight rise (Walker 1983a:60). In the western area a one by two metre test unit was excavated to a depth of 50 cm in which two distinct stratified cultural levels were identified (Level C2 and Level C3). The majority of cultural remains were faunal, but there were a few stone tools and debitage recovered as well. In the eastern area three one metre square tests were excavated as well as a profile trench positioned along the edge of an intermittent drainage channel. Three distinct occupation levels were noted within a depth of 50 cm. A tipi ring on the surface in the east was assigned to Cultural Level 1. Although no diagnostic artifacts were found *in situ*, a Besant projectile point was recovered eroding from the embankment, which led researchers to believe it was associated with one or more of the cultural levels (Walker 1983a:60-67).

4.2 Excavation Methodology

Based on the promising survey results, four seasons of archaeological excavation were conducted at Meewasin Creek in conjunction with the University of Saskatchewan field school. A total of 41 m^2 units were opened, excavated to a maximum depth of 2 m, exposing a minimum of ten occupation levels. Figure 4.1 demonstrates the progression of the excavation block. The majority of this thesis concerns the artifacts and ecofacts

recovered from the excavation block with some mention of the initial survey and test pits.

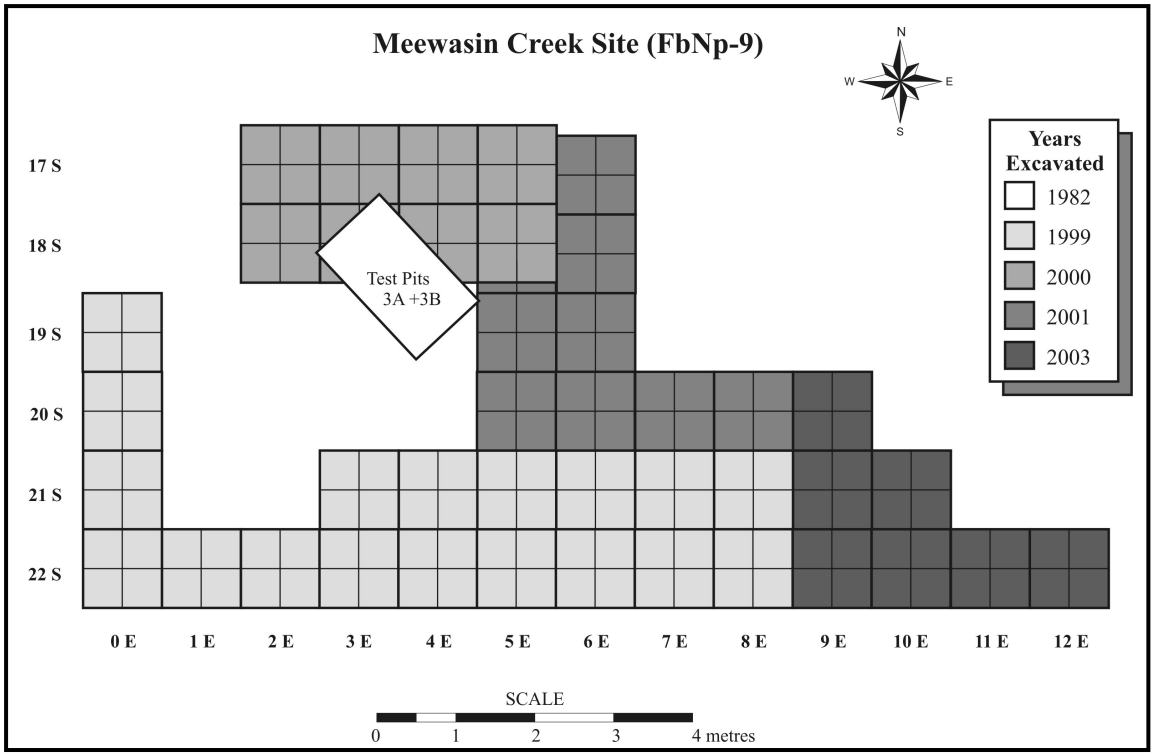

Figure 4.1 Meewasin Creek (FbNp-9) Excavation.

Excavation began in May of 1999, directed by Dr. Ernest Walker and Yvonne Ramey. The kill area in the western portion of the site was the primary focus of investigation. In the first season, a datum was established in the northwest area of the site, and served as a reference point from which all units were measured. The excavation area was divided into a grid comprised of one by one metre squares. An L-shaped excavation consisting of 18 one metre square units was situated to expose cross-sections of the base of the hill and the basin. The northwest corner of each unit served as the unit datum.

Units were divided into quadrants and excavated separately by cultural levels. A cultural level refers to the cultural occupation of a sedimentary layer that was previously a ground surface. It is recognized by the presence of human-modified archaeological remains and often distinguished in the stratigraphy by darker buried soils rich in organic matter. When a surface is stable for any period of time soils can develop, infusing sediment with rich organic nutrients from vegetation and animal material. Levels often correspond with distinct colour and texture changes. In the upper levels the soil changes

were less easily distinguished, so arbitrary levels were employed. Because of the greater density of bone, particularly in Levels C2 and C3, the cultural levels were excavated in increments up to 5 cm deep. Deeper levels were excavated following the natural stratigraphy.

Excavation was primarily conducted with a trowel, utilizing specialized hand tools and brushes around artifacts. The shovel-shaving technique was used in lower levels where artifacts were sparse as well as sterile levels between cultural occupations. When possible, tools and artifacts larger than a quarter were mapped *in situ* on a planview and their provenience measured in relation to its distance south and east of the unit datum. The third dimension was measured as depth below surface (DBS). Artifacts not mapped *in situ* were bagged with similar types in a quadrant bag for each level. All soil was screened though a mesh measuring 6 mm. Soil samples were taken from hearths for fine-screening or water screening. Sod was not screened but inspected closely. Records included planviews, catalogues and daily logs. Each of the students kept a daily log to describe what they had excavated and comment on significant finds for the day. Photographs of the excavation were taken by the directors and various students of the field school and are included courtesy of the University of Saskatchewan Department Archaeology and Anthropology. Close-up photographs of the artifacts and un-attributed figures included in this thesis are courtesy of the author.

In the second season, Dr. Walker and Yvonne Ramey once again led the excavation. The objective in 2000 was to explore the area beside the original 1982 test pit that had produced a dense concentration of faunal and lithic remains. A total of 8 m^2 were excavated to a maximum depth of 92 cm in unit 18S 5E, which corresponds with Level C5. Units 18S 3E and 18S 4E overlay the previously excavated test pit, and therefore only portions of the units needed to be excavated. The excavation techniques in 2000 and subsequent years maintained consistency with the techniques described for 1999.

The third excavation season attempted to link the previous excavation areas. Eight units were opened, plus a narrow section linking units 18S 5E and 19S 5E. In 2001, soil samples were collected from the northwest quadrant of each unit; however, the analysis of these samples is beyond the scope of this research.

After one year hiatus, the field school returned to Meewasin Creek in 2003 to extend the excavation block farther east. This is where the greatest separation of levels occurred, and more activity areas were discovered within the lower levels. No further excavation was undertaken after 2003.

4.3 Analytical Methodology

Analysis of the Meewasin Creek collection began with a thorough review of all the artifacts and ecofacts. Specimens were found to be clean and relatively well-organized. A component of the field school required returning to Wanuskewin Heritage Park Laboratory for washing, re-bagging, identification and cataloguing of the material recovered. Artifacts were cleaned with water and soft brushes. If the condition of bone or charcoal was too fragile, ecofacts were dry brushed or left as is and in kept tinfoil for maximum protection. They were then re-bagged in their corresponding artifact and level bags, labelled with an index card and stored together in appropriately labelled unit boxes. Each artifact received its own catalogue number which was marked on an index card and kept within the artifact bag. Index cards serve as a paper record of the attributes of the artifact and its original location within the site. A preliminary catalogue had been developed which could be followed and modified when necessary. Each artifact had originally been recorded on paper by the students and a significant portion was on *Corel® Quattro® Pro 5* software program. The catalogue was converted to *Microsoft Office® Excel*™ 2003 for greater manageability and accessibility. Re-cataloguing the artifacts ensured consistent classification.

The level of detail recorded within the catalogue must account for at least basic observations that will preserve the fundamental elements of the archaeological site and allow the data to be used for future comparison. Cataloguing requires first the identification of each artifact to one of five classes: faunal, lithic, floral, pottery, or metal. Lithic remains encompass a wide variety of culturally modified or utilized tools, tool by-products, and functional stone materials. Faunal remains include both vertebrate and invertebrate remains of bone, enamel, or shell. Floral artifacts found include charcoal and other plant remains such as seed pods. The mass of each artifact was recorded in grams (g) to one decimal place. Artifacts less than 0.2 g did not register on the scale so

mass was judgementally determined as either .1 or .05 g. Fragments of the same artifact or artifact type from the same unit, level and quadrant were bagged together with one catalogue number. Count refers to the number of specimens of a similar type from the same quadrant and level that have been bagged and catalogued together.

The following is a more in-depth account of lithic, faunal, and cultural artifact classification.

4.3.1 Lithic Assemblage Classification

The lithic artifact assemblage at Meewasin Creek includes stone tools, debitage, and fire-cracked rock (FCR). Tools consist of formed or unformed tools. Formed tools include flaked and ground stone tools while unformed tools include hammerstones, anvils, and other unintentionally modified cobble tools. Flaked stone tools are subdivided into the following categories: projectile points, bifaces, drills, and edge modified stone tools such as scrapers and retouched flakes.

Although most projectile points found at the site are incomplete, in order to provide a comparable body of data, a number of attributes are described and measured when present. Qualitative attributes include material type, colour, and shape. Quantitative measurements include length, width, and thickness, notch width and depth, and basal width and height. Figure 4.2 illustrates the dimensions utilized for metric analysis. In Appendix C, Table C.1 lists metric (quantitative) attributes and Table C.2 lists non-metric (qualitative) attributes of projectile points in greater detail.

Bifaces are flaked tools with flakes removed from both sides. Tool attributes are noted in more detail, including dimension, shape, location of working edge, and cultural affiliation if possible. Appendix C Tables C.3 through C.9 lists attribute measurements of formed tools in greater detail.

Hammerstones are the most frequent unformed tool at the site. They are generally unmodified cobbles with evidence of pitting on one or more ends. The pitting is a result of repeatedly striking another hard object. Hammerstones are used in the lithic reduction stages and tool manufacture. They are also used for butchering and processing faunal resources such as breaking bison longbones in order to render the marrow.

Hammerstones are described by their shape, material type, number of impact locations, and general degree of use.

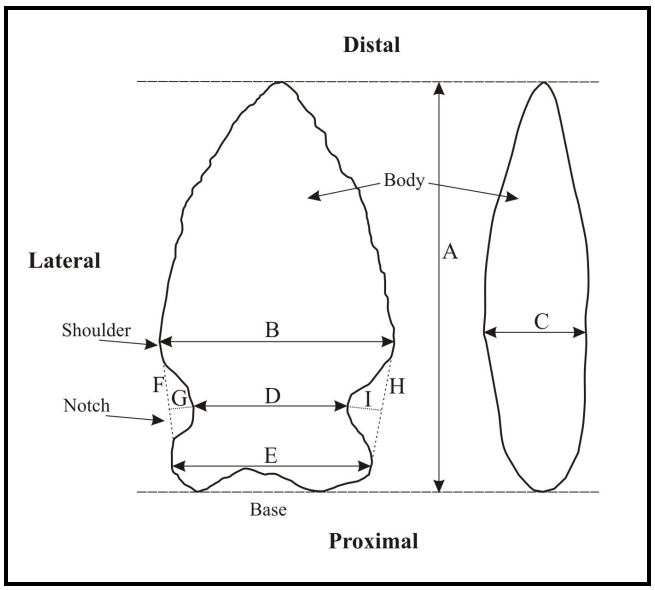

Figure 4.2 Quantitative Measurements of Projectile Points. (A) maximum length, (B) maximum/body width, (C) maximum thickness, (D) neck (inter-notch/stem width), (E) basal width, (F) left notch width, (G) left notch depth, (H) right notch width, (I) right notch depth.

Flaked stone tool debitage can be divided into cores, flakes, and pieces of shatter. Cores are the remains of a cobble or pebble that show evidence that flakes were removed. The flakes may then be further modified into flaked tools. There are a variety of core types, distinguished by the location and type of negative flake scars. Platform cores have had flakes removed from a prepared platform. Conversely, amorphous cores are unprepared and often exhibit random, multidirectional flake removal. Bipolar cores are commonly unprepared, and appear to exhibit a striking platform on both ends of the core. Smaller chert and silicified siltstone pebbles are often split in this manner by setting the unburned material on an anvil and hammering the opposite end. A portion of a core that is too fragmentary to determine flake removal orientation is called a core fragment.

Following Kooyman (2000), flakes are subdivided into more specific categories. Regular flakes are unmodified and show some or all of the following flake characteristics: a distinct platform with or without platform preparation, bulb of percussion, concentric rings and lines of force on the ventral side, and flake scars on the

dorsal side. Flakes are further subdivided as to the degree of lithic reduction. Biface reduction stages can be used to infer tool manufacturing processes and activity areas. The initial stage of tool production results in the production of primary and secondary decortication flakes. Primary flakes are one of the first flakes to be removed from a core and, therefore, have cortex present on the dorsal side. Secondary decortication flakes can be distinguished by the presence of both cortex and flake scars on the dorsal side. Secondary flakes are generally smaller, finer, and often include reduction flakes on the dorsal side. Cortex is rarely present dorsally, but platform cortex may often occur. Tertiary flakes are small, fine flakes less than 2 cm long lacking cortex. These are generally finishing or retouch flakes produced during the latter stages of tool production.

Amorphous lithic fragments that do not exhibit flake characteristics are considered to be pieces of shatter. Unmodified flakes that show evidence of use-wear along one or more of the distal margin of the flake are categorized as utilized flakes. When there is evidence of resharpening, they are defined as retouched flakes. These expedient tools are commonly formed by knapping a sizeable secondary flake from a core, used and refinished as necessary, and ultimately discarded when it is broken, lost, or no longer useful.

Lithic material types are based on descriptions by Kooyman (2000) and Johnson (1998). Appendix C Table C.13 provides a list of descriptions of the lithic types found at the Meewasin Creek site. Common local material types in Saskatchewan that are conducive for flint-knapping include fine-grained siliceous rock such as chert, chalcedony, quartz, and quartzite, as well as siltstones and basalt. Heat-treating is a common method used on various siliceous materials to improve its flaking quality, and was noted when possible. Under heat-stress, rock may change colour, develop a smoother texture, and most importantly, produce a better or more predictable material for flaking (Kooyman 2000:65-67).

The terms fire-broken rock (FBR) and fire-cracked rock (FCR) have been used interchangeably to refer to cobbles exposed to extreme heat temperatures by fire, and have thus undergone a change in structure. Heating rocks was a common practice in order to boil water for many uses such as cooking and fat rendering. After repeated exposure to extreme temperature changes, the cobbles often appear reddened and thin

cracks appear, ultimately breaking the rock, rendering it useless. For the purpose of consistency in this thesis, all fire-altered rocks, whether cracked or broken, are called FCR.

It is important to distinguish the effects from repetitive heating and cooling processes caused by cultural factors from natural processes that may produce similar effects. Minor heating effects on a cobble may be the result of forest fires common on the prairies, or resemble FCR due to other natural processes. Physical effects of weathering, such as physical freeze-thaw cycles, and chemical weathering from soil acidity and oxidization can crack and stain cobbles. Generally, only rocks with definite cracking, reddening and crystallization of the cortex were categorized as FCR.

Red or yellow ochre is a naturally occurring iron oxide that has been used as pigment for many different purposes. The soft clay-like texture is easily mixed with other substances to create paint. It can be found naturally as a clump and may be culturally modified. Ochre is often attributed with sacred significance when found in an archaeological context

4.3.2 Faunal Assemblage Classification

A number of qualitative and quantitative observations must be made in order to conduct a general faunal analysis of the site. The objectives of this thesis in regards to the faunal assemblage are as follows: to determine the number and kind of animals present within each occupation level at Meewasin Creek, to establish which animals were utilized within each level, and to demonstrate how this utilization changed over time.

It is necessary to clarify faunal terminology used in this thesis. A specimen is the fundamental observational unit in zooarchaeology (Lyman 1994). An element is a discrete skeletal component. Grayson (1984:16) best defines the difference between a specimen and an element: "a *specimen* is a bone or tooth, or fragment thereof, from an archaeological or paleontological site, while an *element* is a single complete bone or tooth in the skeleton of an animal." In this thesis the term fragment commonly refers to a specimen that is an incomplete portion of an element.

Faunal remains were first identified to element, or portion of an element, and the side from which it came. Anatomical landmarks on identifiable fragments were listed. Specimens were identified to the lowest taxon recognizable to the researcher; at best, to the taxonomic level of genus and species, otherwise to family, order, or class. All other remains were labelled "unidentified" with respect to taxon.

Qualitative observations of the individual specimens include noting the completeness and general state of preservation. When possible, fragments are defined as to the portion of the complete element from which it originates (proximal, distal, etc). Visible taphonomic processes that have acted upon the specimen are listed. Lyman (1994:1) describes taphonomy as "the study of the transition, in all details of organics from the biosphere into the lithosphere or geological record." Taphonomic processes observed include both cultural alterations such as cut marks or spiral fractures, and natural processes such as root etching, rodent gnawing, or carnivore punctures. The presence of cut marks represents butchering of the animal which directly implies use and probable consumption of the animal. Strongly weathered, fragmented and friable materials are noted on occasion. The state of preservation is too subjective to be scientifically quantitative and, therefore, is only discussed in general terms.

The degree a specimen was heated was noted in terms of unburned, burned, or calcined. Charring or burning processes carbonize the collagen within the bone or enamel. Partially to fully blackened remains were labelled "burned." Burning may be a result of grassfires that commonly swept through the prairies, intentional burning to cleanse the smell from a kill site and to discourage carnivores, or from the localized fires of a campfire. It is only the extreme heat of a controlled fire that results in calcined bone, a blue-grey to white coloured specimen that has had all organic matter incinerated (Lyman 1994). Cooking processes may subject a bone to high heat, but does not necessarily result in burning. The proportion and type of burned faunal remains is relevant to interpreting activities occurring at the Meewasin site. Appendix D Table D.8 contains a detailed comparison of taphonomic processes by level.

Once specimens were observed and detailed in a catalogue, further statistical analyses were calculated and tabulated using Microsoft® Excel™ spreadsheet software. Statistical abbreviations used in this thesis include the following: NISP (number of identified

specimens); MNE (minimum number of elements); and MNI (minimum number of individuals). NISP is a basic level of quantifying taxonomic abundance of faunas. NISP values are used to examine changing taxonomic frequencies through time and across space.

MNE refers to the minimum number of identifiable elements in an assemblage. When only fragments of elements remain, anatomical landmarks are noted and compared; the highest frequency landmark is used to determine the MNE. Appendix D, Tables D.1 through D.6 includes bison element quantification tables per level.

MNI is the most frequently occurring element identified to a side within a taxon. The MNI is calculated as the "smallest number of individual animals needed to account for that most abundant element" (Grayson 1984:88). It is also important to factor in how many of the same element and side is represented in the body. For example, because bison have six lumbar vertebrae, if an assemblage contains seven, consequently the assemblage has an MNI of two. This technique accounts for the simple equation of how many animals occurred and may have been utilized and disposed of at the site; however, it does not account for differential utilization of meat (Grayson 1984). The presence and type of elements recovered may be affected by differential preservation and recovery. The size and developmental stage of a specimen are taken into consideration as the presence of both juvenile and adult elements may imply multiple individuals. The sex of specimens is rarely considered due to the small sample size within each level.

4.3.3 Pottery Classification

The few pottery sherds recovered from the site were submitted to close scrutiny. It is first necessary to determine the sherd's original location on the vessel, such as lip, rim, neck, shoulder or body, in order to reconstruct the original shape. The temper and structural composition can reveal the way a pot was constructed such as coil bound or paddled. The colour is subjective and influenced by many factors such as the temperature to which it was heated during manufacture as well as post depositional processes such as fire or chemical staining.

4.3.4 Biases

There is an inherent bias in the collection processes. Many artifacts smaller than 6.0 mm may not have been collected as they would have fallen through the screen if not noticed while *in situ*. Artifacts such as tertiary flakes and small bone fragments, particularly fragile calcined bone, fall among this category and may not be adequately represented. Soil samples collected during the 2003 excavation are not included in this thesis yet may reveal interesting contents in the future.

Artifacts and ecofacts that were retrieved from the sediment between occupation floors are unfortunately extraneous data. It is difficult to determine whether the artifacts were deposited during the older, lower occupation level and mixed upwards, whether the artifacts were deposited during the later occupation level and mixed downward, or if they were brought in with the intermediate sediment. Because of this ambiguity, they are excluded from calculations, however, significant artifacts such as tools or identifiable faunal remains will be mentioned in the discussion.

Chapter 5
Site Stratigraphy and Chronology

5.1 Introduction

One of the objectives of this thesis is to determine the cultural affiliation of each occupation level and the period of time it was occupied. This site offers an exceptional opportunity to distinguish cultural periods for each level because of the distinct separation of living surfaces due to alternating episodes of slope wash and periods of stability visible in the profile. A cultural sequence of the occupation levels at Meewasin Creek is constructed by the relative position of diagnostic cultural markers such as projectile points and pottery, along with chronometric ages obtained from radiocarbon dating. The cultural affiliation of the people who occupied the site is discussed in the following chapters. The paragraphs below outline the stratigraphy at the site and present the radiocarbon ages obtained for the four levels.

5.2 Stratigraphic Sequence

Due to the geophysical processes discussed in Chapter 2, the stratigraphic profile at Meewasin Creek appears as alternating layers of light and dark sediment, reflecting a cyclical pattern of deposition and stability. The buried soil levels are generally well defined which indicates periods of slope stability when soils had time to develop. Figure 5.1 demonstrates the multi-layered nature of the sediment deposited primarily by slope wash.

The topography of the site is a gently sloping basin with the deeply buried levels on a greater incline than the shallow upper levels. As the surface slopes gently downward to the east, and less noticeably to the south, multiple episodes of slope wash have separated the lower levels distinguishing multiple occupations within the eastern units. Figure 5.2 illustrates the sloping nature of the site with condensed occupation levels to the west and the separation of levels to the east.

Figure 5.1 South Wall of Excavation Block: Units 22S 0 - 8E. (Tags indicate cultural levels.)

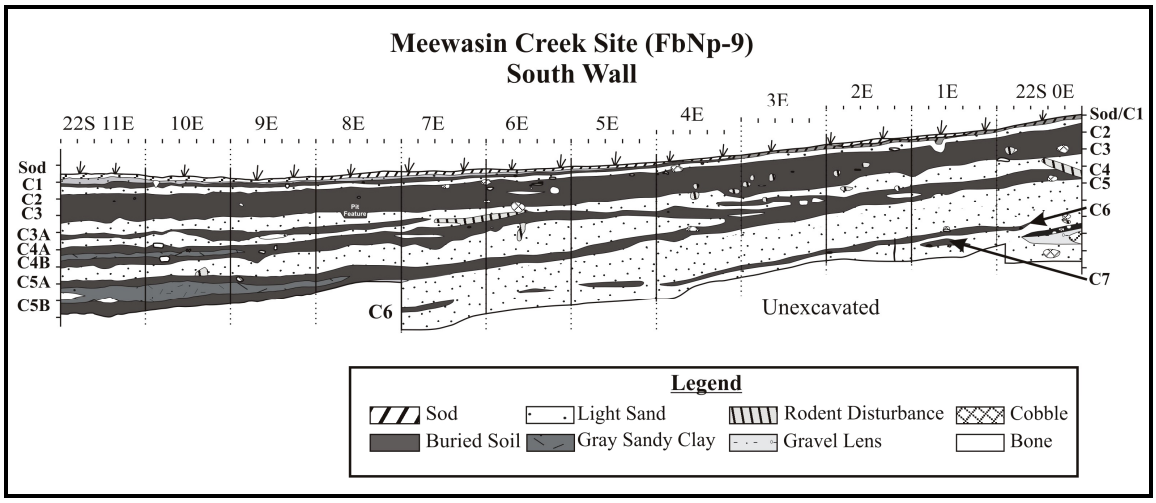

Figure 5.2 South Wall of Units 22S 0 - 11E.

In the first year of the excavation, 7 cultural levels were noted and labelled sequentially. As the excavation continued eastward, additional levels were exposed for a total of 10 occupation levels. Cultural Level 1 is the most recent occupation level, located just below the sod. The upper three levels (levels C1, C2, and C3) are well defined and continuous across the site. Below Cultural Level 3 in the eastern half of the excavation, an additional buried soil is evident. This lens, labelled Cultural Level 3A

(C3A), is sandwiched between culturally sterile sandy sediment, and is a separate occupation from the levels above and below. Cultural Level 4 extends across the site, compressed into one combined level in the west, and separated in the east into Level C4A above and Level C4B below. Cultural Level 5 is similar to Level C4 in that it separates in the eastern units into Level C5A and Level C5B. Cultural Level 6 is a discontinuous buried soil with few artifacts, although only eight units were excavated deep enough to reach it. Level C7 is an ephemeral lens, observed in only one unit (22S 1E).

5.3 Radiocarbon Analysis

Radiocarbon ages were obtained from five levels at Meewasin Creek. Samples supplied were from both bone collagen and charcoal with moderate success and accuracy. Bone and charcoal from the deeper levels appeared infrequently and in poor condition, limiting the levels that could be dated. Table 5.1 outlines the radiocarbon ages for Meewasin Creek. Appendix B contains additional calibration results.

During the initial survey, a radiocarbon date from a large bison bone from Level 3 of Test Pit 3 in the kill area returned an uncalibrated age of 2130 ± 125 B.P. (S-2366; Walker 1988:83). Using the *CALIB 5.0.1* radiocarbon calibration program based on Stuiver and Reimer (1993), resulted in a calibrated radiocarbon age of 2090 ± 275 B.P.

Table 5.1 Calibrated Radiocarbon Ages.

Sample	Level	Sample Type	Uncalibrated Age B.P.	Calibrated Age B.P. [2]	Margin of Error (+/-)	Two Sigma Calibrated Age Range
BGS 2742	C2[1]	bone	1754	1660	45	1870 - 1542 cal B.P. [3]
S-2366	C3	bone	2130	2090	125	2365 - 1814 cal B.P. [4]
BGS 2740	C3A	charcoal	2405	2360	50	2711 - 2339 cal B.P. [3]
BGS 2743	C4B	bone	2286	2340	70	2433 - 2123 cal B.P. [3]
BGS 2741	C5A	charcoal	3750	4120	120	4437 - 3731 cal B.P. [3]

[1] See explanation below, originally believed to be Level 3.
[2] Calibrated ages are based on Stuiver and Reimer (1993).
[3] Calibration datasets are based on Stuiver *et al.* (1998).
[4] Calibration datasets are based on Reimer *et al.* (2004).

After the more recent excavations, four samples were submitted to Brock University Earth Sciences Radiocarbon Laboratory for analysis. Two of the samples were bison limb elements, and two samples were from charcoal.

Bison tibia and humerus fragments believed to be from Level C3 of units 21S 0E and 21S 5E were combined to supply an uncalibrated age of 1754 ± 45 B.P. (BSG 2742). The calibrated age is 1660 ± 50 B.P. (Stuiver and Reimer 1993). This composite assay must be considered cautiously. After a closer review of the records, it is evident that the distal humerus from unit 21S 5E, which makes up the majority of the collagen sample (87.5%), was most likely retrieved from Level C2, thereby skewing the results. Levels C2 and C3 were excavated in arbitrary levels because of the difficulty in differentiating the occupations while excavating, and therefore the division between the two levels is not necessarily accurate in all units.

A charcoal sample from Level C3A returned an uncalibrated age of 2405 ± 50 B.P. (BGS 2740). The charcoal from this level is from units 21S 7E, 21S 8E and 18S 4E. After calibration, the age is 2360 ± 50 B.P. (Stuiver and Reimer 1993). Using two sigma probability distribution, this age is measured between 2513 – 2342 cal B.P. (p = .66). The sample size of the charcoal was of moderate size suggesting fair accuracy.

Faunal remains from Level C4B were sparse, although enough bison shaft fragments from units 18S 5E, 18S 6E, and 19S 6E were able to provide an uncalibrated age of 2286 ± 70 B.P. (BSG 2743). The calibrated age is 2340 ± 70 B.P. (Stuiver and Reimer 1993). Using two sigma probability distribution, this age is measured between 2471 – 2115 cal B.P. (p = .98). This faunal sample was dry and crumbly and contained a moderate amount of collagen. The calibrated age ranges of Levels C3A and C4 overlap within the range of probability.

Charcoal samples from Level C5A returned with an uncalibrated age of 3750 ± 120 B.P. (BSG 2741).The calibrated age is 4120 ± 120 B.P. (Stuiver and Reimer 1993). Using two sigma probability distribution, the age is measured between 4423 – 3826 B.P. (p = .98). The charcoal sample was very small in size and only produced a fair accuracy; however, the dates still place the level significantly earlier than Level C4.

Chapter 6
Cultural Level 1

6.1 Introduction to Cultural Level 1

This chapter summarizes the cultural assemblage of artifacts, ecofacts, and features found within the most recent cultural level of the Meewasin Creek site. Before delving into the assemblage, it is important to present the small assemblage of artifacts found on the surface and within the sod layer. However, as they cannot be definitively attributed to C1, the following discussion is brief.

Cultural Level 1 (C1) is a recent Protocontact occupation level situated in a thin, continuous layer directly below the sod. The soil is comprised of dark, organic-rich material in a loam matrix. The level is approximately 3 to 5 cm thick, extending across the site at a maximum depth of 10 cm below surface at the eastern portion of the excavation (Figure 5.2). At the western extent the level is very thin and mixed within the sod. In the east, a fine sandy loam layer has settled above the level creating greater separation from the sod.

6.2 Surface and Sod Assemblage

Artifacts from the surface were recovered during the original survey in the early 1980s. Unfortunately, provenience was not recorded at the time, aside from originating within the boundaries of the site.

Archaeological remains from the surface and sod were catalogued separately from Level C1 when possible. As the site was excavated over four field seasons, with numerous students and visitors, naturally some compaction of the sod occurred and it was therefore thin to non-existent in some units. The presence of sod indicates that the surface has remained relatively stable for at least several decades.

6.2.1 Lithic Artifacts from the Surface and the Sod

Four flaked stone tools were found on the surface during the original survey. A Swan River chert Besant projectile point was found eroding out of the channel embankment from one of the buried occupation levels (Walker 1983a:60). The nearly complete point is missing only the tip. The shape is compact with a straight base and wide, shallow side notches (Figure 6.1; Catalogue #32). The short tool has likely been reworked, but the symmetrical shape was maintained.

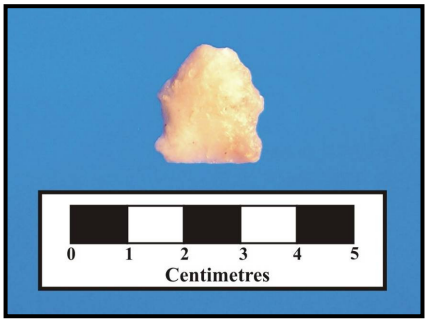

Figure 6.1 Besant Projectile Point from the surface. (Cat. #34)

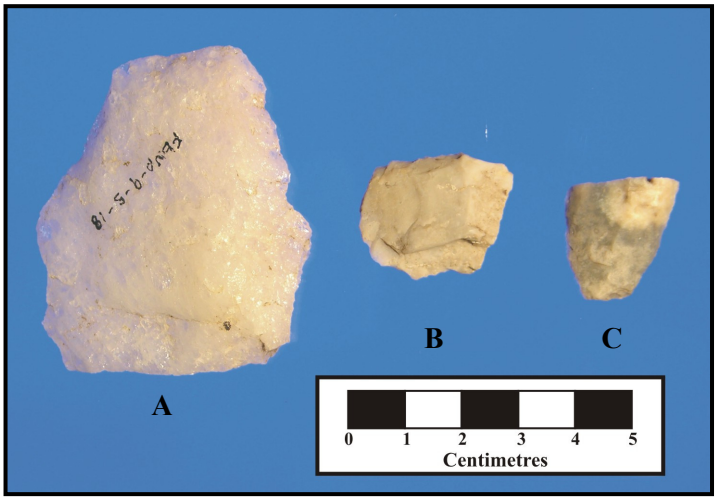

Figure 6.2 Retouched Tools from the surface. (A = Cat. #18; B = Cat. #33; C = Cat. #32)

Three unifacially retouched flakes were found on the surface as well (Figure 6.2). Of these, the first is a large coarse quartz flake with distal and side working edges (Catalogue #18). The second tool is a grey Swan River chert irregular flake with retouch on one lateral end (Catalogue #33). The third retouched tool is a small, fine-grained Swan River chert flake fragment with lateral thinning and retouch and a broken distal end (Catalogue #32).

Two hammerstones were recovered from the surface. One palm-sized, quartzite hammerstone shaped like a flattened egg has impact scars on both ends, along an edge, and one face (Figure 6.3; Catalogue #31). The second is a basalt hammerstone fragment that shows evidence of battering at one end, and has broken at the opposite end (Catalogue #30). The cobble was likely egg-shaped originally.

Figure 6.3 Hammerstone from the Surface.

Debitage from the surface is outlined in Table 6.1. Swan River chert is the most common material, followed by quartz. Shatter (44.4%), is closely followed by secondary flakes (37.0%) are the most frequent debitage types found. These artifacts were found throughout the site, with a heavier concentration in the sod in the southwest quadrant of unit 22S 10E.

Table 6.1 Surface and Sod Lithic Debitage Types.

Material Type	Primary	Secondary	Tertiary	Shatter	Total
Chert	1	1	-	5	7
SRC	1	17	2	3	23
Chalcedony	-	-	-	1	1
Quartz	-	2	-	11	13
Quartzite	3	-	3	2	8
Silicified Wood	-	-	-	1	1
Siltstone	-	-	-	1	1
Total	**5**	**20**	**5**	**24**	**54**
% Total	**9.3**	**37.0**	**9.3**	**44.4**	**100%**
H/T = Heat-treated; Total Amount of Heat-treated Debitage = 2					

Additional lithic remains retrieved from the sod include one granite FCR fragment and a Swan River chert core with at least four flake scars remaining (Catalogue #3). Furthermore, a red jasper endscraper (Catalogue #5909) was found in a profile trench excavated by backhoe (Walker 1983a:67). These artifacts from the surface and the trench may not add great revelation to the interpretation of the site because of their lack

of temporal or spatial measurements, but they do reflect the range of materials and tools utilized at the site.

6.2.2 Faunal Remains from the Surface and the Sod

A number of faunal fragments were recovered from the surface and within the sod. The NISP is 86, with a mass of 206.3 g. The majority of fragments are unidentifiable, however, eight bones identified to element and species are attributed to *Bison bison*. Both hindlimb and forelimb fragments are represented, mandibulary teeth, and a rib fragment. A juvenile bison canine conflicts with the otherwise adult assemblage bringing the minimum number of individuals (MNI) to two. All but three small calcined bone fragments are unburned. Due to the limited number of fragments and individuals represented, no further discussion is necessary.

6.2.3 Surface Features

A single stone circle was noted on the surface, but as the stones are deeply buried, it will be discussed below with other Level 1 features. No other cultural features were noted on the surface.

6.3 Cultural Level 1 Lithic Assemblage

6.3.1 Unformed Tools

Two granite hammerstones were discovered in the uppermost cultural level. The first, a rounded pyramid-shaped cobble, has minor impact marks at one corner that extends along one edge towards the apex (Catalogue #5016). The base is extremely smooth and reddened, however, no striations are visible under a microscope to suggest it was culturally modified. The second hammerstone can be classified as an anvil as well (Catalogue #1550). The granite cobble is a rounded, elongated tetrahedral-shape with a large impact area at one end. The apex, defined as the rounded corner opposite the largest flat side, or base, has impact marks indicative of use as an anvil. The anvil mark is a linear impact area perpendicular to the long axis of the tool.

6.3.2 Flaked Stone Tools

A Swan River chert unifacially flaked stone tool fragment was recovered from Test Pit 3B, within the excavation block (Catalogue #197). The small fragment has retouch along the lateral margin of the flake. The original tool has shattered, but it would likely have had a planar-convex cross-section. The material was heat-treated. Unfortunately, the remaining piece is too small to extrapolate tool form or function. No other flaked stone tools were recovered from this level within the excavation block, although it is worth mentioning that a second tool also found during the initial testing. The large quartz biface was recovered from Level 1 of Test Pit 1 (Walker 1983a:68). The lenticular tool has an asymmetrical bi-convex profile (Figure 6.4; Catalogue #43). Fracture lines indicate that the base was once stemmed allowing it to be hafted, although part of the base has since broken off.

Figure 6.4 Bifacial Stone Tool.

6.3.3 Debitage

The small assemblage of debitage recovered from Level C1 totals 90 pieces (Table 6.2). Chert is the most common material type, amounting to 49 flakes and pieces of shatter and representing 54.4% of the total assemblage. Swan River chert is the second most common material, accounting for 37.8% of the total debitage. The remaining debitage is distributed sparsely among six different material types. Within this occupation level, the most common type of debitage are tertiary flakes (73.3%),

followed by secondary flakes (16.7%), shatter (4.4%), and primary flakes (5.6%). This suggests the primary tool activity is rejuvenation and reshaping of tools, rather than stone tool production. Only a small proportion (8.9%) was noticeably heat-treated.

Table 6.2 Level C1 Lithic Debitage Types.

Material Type	Primary	Secondary	Tertiary	Shatter	Total
Chert (white, grey, tan, black, brown)	2	3	43 (H/T: n=5)	1	49 (H/T: n=5)
SRC	2	10 (H/T: n=2)	20 (H/T: n=1)	2	34 (H/T: n=3)
Chalcedony	-	-	1	-	1
Quartz	-	1	-	1	2
Quartzite	-	1	1	1	3
Siltstone	-	-	1	-	1
Silicified siltstone	1	-	-	-	1
Total	**5**	**15**	**66**	**4**	**90**
% Total	**5.6**	**16.7**	**73.3**	**4.4**	**100%**
H/T = Heat-treated; Total Amount of Heat-treated Debitage = 8					

6.3.4 Fire-Cracked Rock

Results show that 97 pieces of FCR were found in Level C1, with a total mass of 15.6 kg (Table 6.3). The majority of the material type by mass is granite, at 13.3 kg (85.0%). The remaining material types include gabbro, gneiss, quartzite, and siltstone. Many of the FCR fragments have broken or crumbled, as the average (mean) mass is 161.4 g.

Table 6.3 Level C1 Fire-Cracked Rock.

Material	Count	%	Mass (g)	%
Granite	76	78.4	13312.2	85.0
Gneiss	1	< .1	1304.5	8.3
Gabbro	10	10.3	11.8	.1
Quartzite	11	11.3	1020.4	6.5
Siltstone	1	< .1	7.0	< .1
Total	**97**	**100%**	**15653.7**	**100%**

6.4 Cultural Level 1 Faunal Assemblage

6.4.1 Taxon and Element Identification

A large number of highly fragmented faunal remains was recovered from the uppermost cultural level. Analysis revealed a total of 5,717 specimens with a combined mass of 11,972.6 g (Table 6.4). Only 36.8% of the specimens were identified to the

family, genus, or species level of taxonomic classification. The remaining small fragments and indistinguishable long bone fragments could only be identified to the more generic levels of order or class.

Analysis indicates that 35.2% of the total number of specimens for the level are attributed to *Bison bison* (NISP = 2,014). A minimum of six bison are associated with this level, of which at least one is a juvenile between the ages of one and five.

The most frequently occurring bison elements identified include the distal tibia and lateral malleolus, each with six elements from the right side, and fewer from the left. Tarsals are also well represented. Mandible and skull fragments have the greatest NISP (n = 772 and n = 557, respectively) with low MNI representation, corresponding with the high fragility of the bones and teeth.

Table 6.4 Level C1 Faunal Taxa.

Taxon	NISP	Mass (g)	MNI
Bison bison	2,014	8283.6	6
Lynx lynx	1	1.1	1
Lepus americanus	1	.7	1
Spermophilus sp.	58	2.3	2
Microtus pennsylvanicus	2	.2	2
family Canidae	26	95.2	1
family Cervidae	1	17.4	1
order Artiodactyla	101	353.8	-
Order Rodentia	5	.4	-
class Mammalia	3,508	3,217.9	-
Total	**6,429**	**15,107.9**	**14**

A mature lynx is represented in the excavation assemblage by a single left tibia fragment from unit 17S 5E. Furthermore, within Test Pits 3A and 3B, an additional 29 bone fragments from the same lynx were recovered. The lynx fragments represent all four limbs, several vertebrae, and multiple teeth. Although the characteristics of lynx (*L. lynx*) and bobcat (*L. rufus*) are quite similar, lynx were more likely present within the study area. Currently, the common range for bobcat is in the southern portion of the province, whereas lynx are generally found within the Boreal Forest, but may wander south into the Aspen Parkland, particularly during times of low snowshoe hare populations (Wapple, 1999:142; Banfield, 1974: 350).

The family Canidae, which includes wolves (*Canis lupus*), domestic dogs (*Canis lupus familiaris*), coyotes (*Canis latrans*), and foxes (*Vulpes sp.*), comprises .5% of the assemblage. Due to the size overlap and similarity in morphology, species identification is difficult without a complete skull or mandible portions to provide multiple measurements. Canid faunal remains identified in this level include a partial left fore-limb, a left femur, and an axis vertebra, all suggestive of a single large dog or wolf. Canids are frequently found in Plains archaeological sites. Dogs were commonly kept as pets and as pack animals, and provided an important contribution to diet in leaner times. Wild canids may have been attracted to carcasses at kill sites or scraps at campsites, and their furs were sought after by trappers. If a nuisance, canids may have been killed.

Level C1 is a relatively recent deposition layer, and therefore, there was a greater recovery of smaller, intrusive animals than in deeper levels. However, rodents combined amount to only .9% of the assemblage by count. Mandibles and cranial fragments indicate the presence of at least two ground squirrels (*Spermophilus richardsonii* or *Spermophilus franklinii*) and two voles (*Microtus pennsylvanicus*), which are all extremely common in Saskatchewan.

Lagomorphs are represented in the assemblage by a single right mandible fragment from a snowshoe hare (*Lepus americanus*). Rabbits and hares are commonly found throughout Saskatchewan and have been frequently hunted and trapped for furs and food.

The family Cervidae, which includes mule deer (*Odocoilius hemionus*), white-tailed deer (*Odocoilius virginianus*), and elk (*Cervis celaphus*), is represented by a single rib. The taxon Artiodactyla refers to a more general classification of larger mammals such as the ubiquitous bison, cervids, and the more rarely observed moose (*Alces alces*) and pronghorn antelope (*Artilocapra americana*). This ungulate taxon has an NISP of 101, which accounts for 1.8% of the assemblage.

The remaining 3,508 specimens could only be identified to the more generic taxon, mammal. These comprise 61.4% of the assemblage. No avian or other non-mammal remains were found in this level.

6.4.2 Taphonomy

Burning is the most common taphonomic process in the entire site although only 3.7% of the Level C1 assemblage (.7% by mass) is burned. Calcined bone accounts for .3% of the assemblage. Burned bone is scattered throughout the excavation block, whereas calcined bone is scarcely distributed only in the northern units. Table 6.5 lists the Level C1 taphonomic processing.

One important aspect of faunal analysis is to evaluate how an animal is butchered and used after death, in order to understand the value of the animal in the past. Four elements have cut marks, all bison or large mammal specimen with characteristics not inconsistent with bison. The NISP for these is 52, indicating a high degree of processing. A number of shaft fragments have impact marks and green fractures, butchering indicators implying breakage of the element while still fresh. Battering is a common process to access the rich marrow inside limb bones. The "Other Marks" in Table 6.5 refers to a series of three chop marks on one bison rib, gnaw marks occurring on a rib and shaft fragment, carnivore tooth marks and punctures on a bison sacrum, and battering impact marks on two other bone fragments.

Table 6.5 Level C1 Taphonomy.

	Unburned		Burned		Calcined		Cut Marks	Other Marks
Type	**NISP**	**Mass (g)**	**NISP**	**Mass (g)**	**NISP**	**Mass (g)**	**NISP**	**NISP**
Bone	4,032	10,805.8	211	81.7	16	2.1	15	6
Enamel	365	441.2	13	1.9	-	-	-	-
Bone/ Enamel	1,080	639.9	-	-	-	-	-	-
Total	**5,477**	**11,886.9**	**224**	**83.6**	**16**	**2.1**	**15**	**6**

6.5 Cultural Level 1 Pottery

One pottery sherd was found in unit 22S 9E (Figure 6.5; Catalogue #5618). The rimsherd is comprised of a well-consolidated, grit-tempered paste. The compact, layered paste is black with a smooth surface on both sides. The rim is pinched with straight/curved edges. It is too small to infer cultural affiliation.

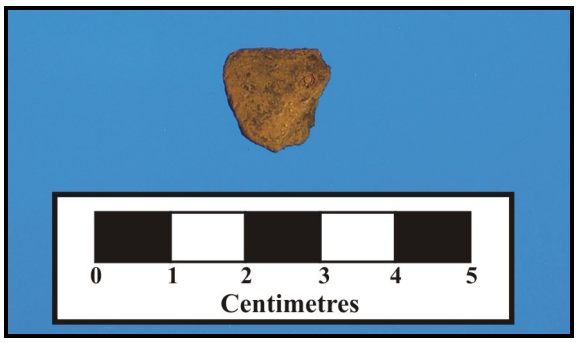

Figure 6.5 Level C1 Pottery Rim Sherd.

6.6 Cultural Level 1 Metal Artifacts

Seven spent lead .22 calibre bullets were found within the excavation block (Figure 6.6). They vary in degree of deformation as a result of use. The bullets were localized to units 21S 7E and 22S 7E, with two in each unit, and two more in adjacent units to the east, and west. The seventh bullet was from unit 17S 3E.

Correspondingly, two brass .22 cartridge cases were found (Figure 6.7). Both have a "D" stamped on the end signifying the Dominion Cartridge Company, and were made anytime between 1900 to present (Manaray 1973, cited in Brandon 1989:396). One cartridge shell in a good state of preservation measures 11.0 mm (.38 in) long and has a dent near the rim from firing. It was found in the upper 16 cm. The second cartridge, found in the sod 0 - 9.5 cm below surface, has darkened and collapsed with age and is 15.5 mm (.63 in) long. Cartridge cases are located northwest and southeast of the bullet cluster. The presence of the small calibre ammunition is assumed to be from someone hunting small game on the property prior to the creation of the park.

Figure 6.6 .22 Calibre Bullets.

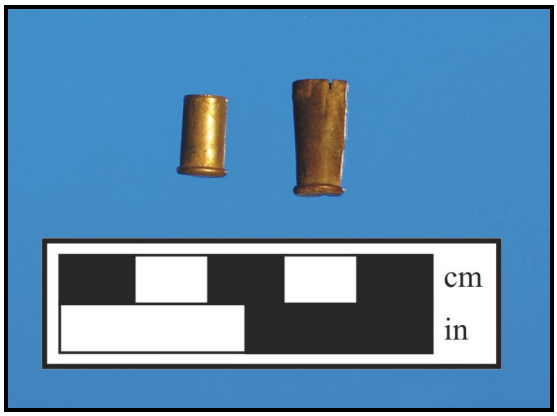

Figure 6.7 Dominion Cartridge Cases .22 Calibre.

Approximately 80 small ferrous fragments totalling 15.3 g were found mostly concentrated in the southeast half of the year 2000 excavation units. These northernmost units closest to the steeper slope likely represents a refuse pile of tin cans or scrap metal. No seams or other distinct features are available for more detailed analysis or chronometric dating.

6.7 Cultural Level 1 Features

Three hearth features were noted in Cultural Level 1 of the excavation block. The tipi ring in the eastern portion of the site is also discussed. A rodent burrow in unit 18S 2E and root cast in 17S 6E are the result of natural disturbances. A large number of cobbles are dispersed across the site, but few can be defined as cultural. They are likely the result of natural processes causing slope-wash. Some of these cobbles may have been used as hammerstones in bison bone processing, indicated by the high number of fragmented pieces of bone, but discarded before significant trauma to the stone occurred. Figure 6.8 is a map of the excavation block, diagramming the location of features in relationship to mapped artifacts.

Feature 1-1 is a small basin-shaped hearth located within the northwest quadrant of unit 21S 8E. The long axis of the ovoid-shaped ash stain is 35 cm; the perpendicular diameter is 25 cm. An inner, reddish, oxidized soil stain is 28 cm by 18 cm. Small amounts of burned and calcined bone and charcoal were found in the northern half of the unit, as well as neighbouring units to the north, south, and west.

Feature 1-2 is a shallow hearth noted in the eastern wall of unit 18S 6E (Figure 6.9). The feature is approximately 55 cm in diameter, and 7 cm deep. Charcoal is sparsely distributed in the unit; 10 pieces were collected with a mass of less .5 g. Four pieces of burned bone were noted as well. A significant amount of bone fragments were recovered within the unit and surrounding units. Lithic artifacts were scarce.

Feature 1-3 is a moderately deep hearth located in the northwest quadrant of unit 20S 18E. The hearth is visible in the north wall as a small, basin-shaped feature appearing similar to Feature 1-2. The hearth extends well below Level C1, but not as deep as Level C2. The approximate size is 55 cm in diameter and 8 cm deep. Small charcoal pieces

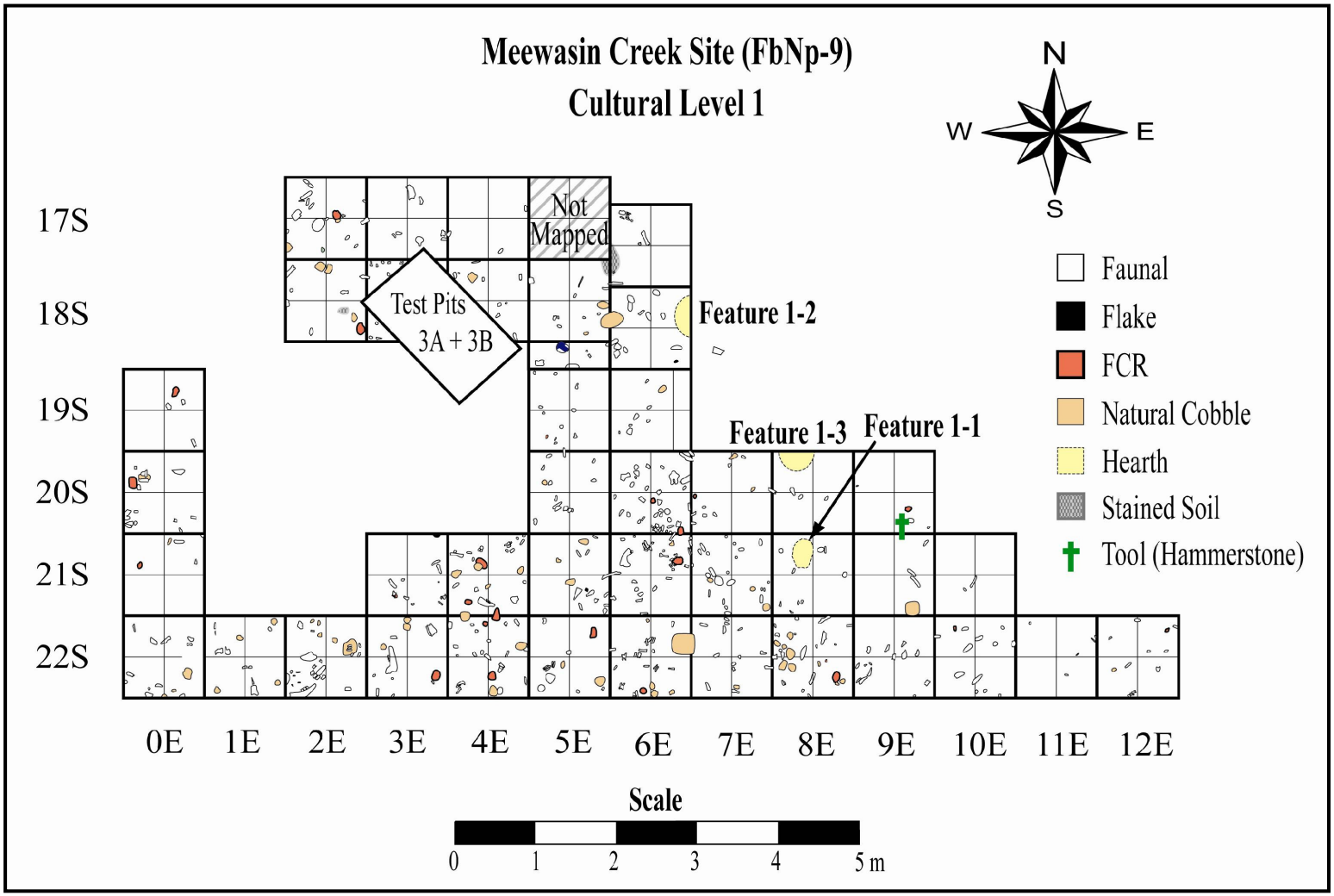

Figure 6.8 Distribution of Artifacts, Ecofacts and Features in Level C1.

and multiple bone fragments, most unidentifiable, were found within the surrounding unit. This hearth is located approximately 75 cm north of Feature 1-1.

Figure 6.9 Feature 1-2: Hearth in East Wall of Unit 18S 6E.

Charcoal was dispersed throughout the level, but only a few units supplied enough material to collect. A significant amount of charcoal was collected from unit 20S 0E, and a small amount in the unit to the south. A trend of charcoal was collected from the central units, to the south, west, and northwest of the hearth features.

The tipi ring on the surface in the eastern habitation area is a partially buried, single-walled circular alignment of cobbles (Figure 6.10). The stones are generally closely spaced, but more widely dispersed in the southwest quadrant. The ring is located approximately 10 m east of the excavation block and is likely associated with the activities conducted within the kill area, where the excavation is located. Also found near the tipi ring is an unburned bone fragment, a piece of red ochre, and charcoal (Walker 1983a).

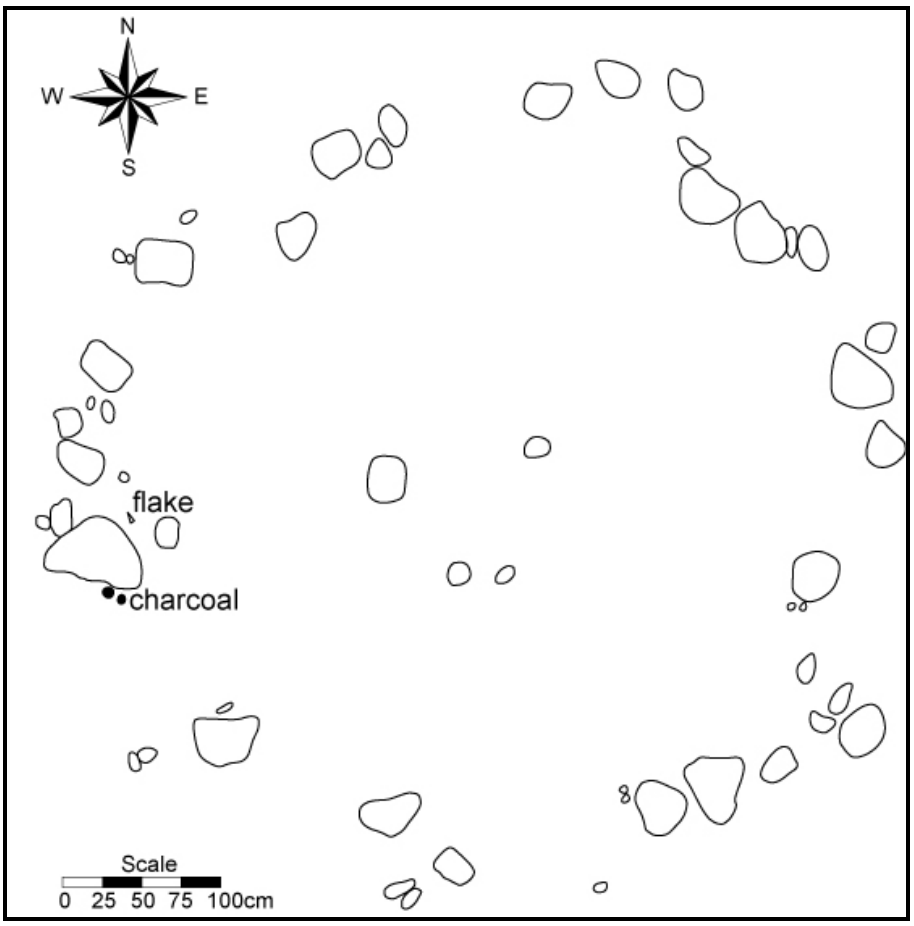

Figure 6.10 FbNp-9 Stone Circle Plan. (Adapted from Walker 1983a:66.)

6.8 Interpretation of Cultural Level 1

The first cultural level can be interpreted as a mixed-use site. The buried soil is well developed, up to 5 cm thick, suggesting a significant period of time passed until sediment were deposited above and the current sod developed. The artifacts, ecofacts and features suggest multiple activities occurred within the study area.

Faunal remains clearly indicate that several bison were killed at the site, although processing activities and an associated habitation are present as well. Identified faunal remains are predominantly bison and most are well-processed and highly fragmented. This site contains a large percentage of distal limb elements which are most often found at a kill site because they lack high quality meat and are easily discarded. Cranial elements and mandibles are commonly fragmented to access the tongue. The hearths, scattered FCR and hammerstones correspond with processing activities, such as

rendering fat from the fragmented longbones. The stone circle nearby indicates a campsite component.

It was hoped that seasonality could be determined from the immature bison bones and mandibles present, but the poor preservation of the bone makes age assessment difficult. A determination of seasonality was not possible.

The few lithic remains demonstrate primarily expedient tool manufacture from local materials. No cores and scarce debitage indicates only minor lithic tool use or rejuvenation. Hammerstones and cores were used and discarded throughout the site. If projectile points or other well-developed tools were used, they were either discarded beyond the boundaries of the excavation, or were highly valued and carried away when the site was abandoned.

Unfortunately, a lack of diagnostic artifacts makes it difficult to determine cultural affiliations associated with the occupation level. The presence of lithic artifacts and pottery indicate a Late Precontact occupation with a Protocontact component. The only diagnostic indicators include the European goods, particularly the .22 calibre bullets and corresponding cartridges, which date to the last century and are easily mixed within the level.

Chapter 7
Cultural Level 2

7.1 Introduction to Cultural Level 2

Cultural Level 2 (C2) is a Late Precontact period bison kill, represented by a thick dark organic-rich level stretching continuously across the site (Figure 5.2). The depth of the level is from 12 to 25 cm below surface in the west and 15 to 25 cm below surface in the east. The thickness of the level reflects a long period of stability as the loamy soil had time to develop and an extensive bone bed and multiple artifacts including lithic tools, lithic debris, and pottery were deposited in the archaeological record. A light-coloured sandy loam layer approximately 5 cm thick separates C2 from the level above. A few cultural remains were found in this sandy in-between layer, but it was predominantly culturally sterile. The colour and texture of the C2 soil was difficult to differentiate from the older occupation below, so arbitrary levels were employed during excavation. Because of the thickness of sediment in this level and the nature of the overlaying bone, Level C2 was taken out in two to four arbitrary levels (5 cm), but analyzed as one occupation level.

7.2 Layer between C1 and C2

Before discussing the Level C2 assemblage, it is important to provide a brief summary of a number of cultural remains from the sandy-loam sedimentary layer between Levels C1 and C2. These interlayer remains were found within the seven easternmost units (n = 87).

One FCR cobble was recovered from unit 22S 10E with a mass of 35.6 g. Nine small pieces of FCR from units 22S 11S to 22S 12E have a combined mass of 7.4 g. No stone tools or debitage were found. A minimal amount of charcoal was recovered from unit 22S 12E.

A number of faunal remains were recovered from this interlayer (NISP = 71). Unburned bone totalled 318 g, and unburned enamel is 5.2 g. Burned and calcined remains are sparse at only one fragment each. Recovered faunal remains include bison (NISP = 10; MNI = 1), ungulate fragments (NISP = 4), and large animal fragments (NISP = 5).

Specimens are comparable to those found in both Level C1 and Level C2, and thus, were likely trampled down from above, or possibly, transported from below.

7.3 Cultural Level 2 Lithic Assemblage

7.3.1 Ground Stone Tools

Figure 7.1 Grooved Maul.

A grooved maul fragment found within the second cultural level is the only ground stone tool found at this site (Figure 7.1; Catalogue #1598). The tool was recovered from unit 22S 6E approximately 30 cm below surface. This large round granite maul has split along the groove and only half of the tool was recovered. This specimen has a mass of 927.5 g, suggesting that the complete tool would be well over a kilogram. The

longitudinal shape is semicircular and the latitudinal cross-section shape is rounded-rhomboidal. Impact marks indicate that it was a naturally rounded river-cobble. The exterior has oxidized to a reddish colour; however, the pecked groove and fractured interior have not been affected. The groove was pecked along where the cobble would have been lashed to a handle with hide. Minimal evidence of battering at the end of the tool suggests that the opposite end was the primary impact location.

7.3.2 Unformed Tools

Two unformed tools were recovered in the second cultural level. A small triangular granite hammerstone was found within unit 22S 10E, 36 cm below surface (Catalogue #5853). The cobble has impact marks on three of the rounded corners as well as a small impression on both of the flat sides, indicating that it may have been used as an anvil. The small cobble has a mass of 384.2 g.

A cylindrical basalt cobble was used as a both a hammerstone and pestle (Catalogue #5258). Evidence of pecking from use as a hammerstone is visible at one end. The opposite end has a smooth, flat, round surface. Under a low powered microscope, striations are visible. The tool was found in unit 21S 9E, 27 cm below surface, and has a mass of 821.5 g.

7.3.3 Flaked Stone Tools

There were three flaked stone tools recovered from the second cultural level within the excavation. One bifacially flaked tool fragment is comprised of brown chalcedony resembling silicified peat (Catalogue #1557). Potlids resulting from heat-treatment have removed detail from both sides of the tool. The artifact is too small to provide sufficient interpretation, or to be associated with a particular tool type. A grey chert end/sidescraper fragment shows evidence of unifacial retouch along the two original edges (Catalogue #4112). The side edge is the only complete working edge, which is slightly convex and 24.5 mm long. The other working edge is perpendicular to the side edge, but has broken too close to the corner to distinguish further. A utilized flake is clearly an expedient chopping tool with minimal modification. A large Athabasca quartzite spall (Catalogue #3979) shows use-wear and impact marks along two margins.

Two additional tools from Test Pit 3B are included in this discussion, but they are both poorly represented. One small chert fragment exhibits bifacial retouch (Catalogue #267). The final tool is a coarse sandstone utilized flake (Catalogue #254). There is heavy use-wear at the distal end of the flake including a small concave portion that resembles a spokeshave. Figure 7.2 illustrates four of these tools.

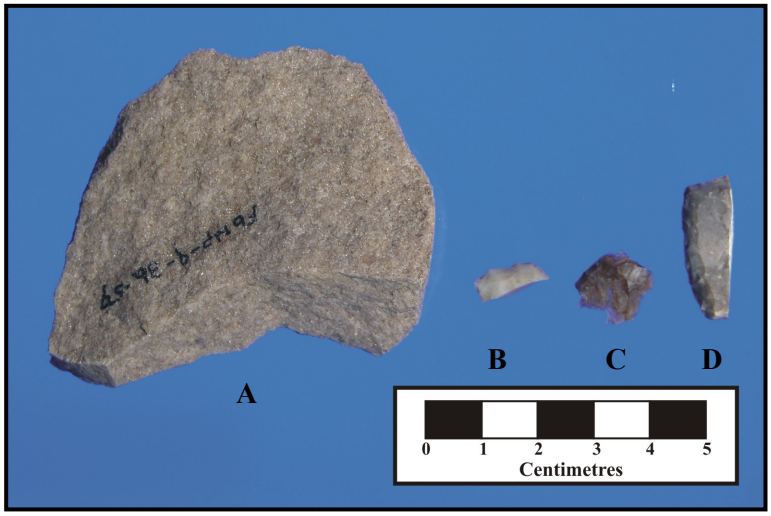

Figure 7.2 Level C2 Flaked Stone Tools. (A = Cat. #254; B = Cat. #267; C = Cat. #1557; D = Cat. #4112)

7.3.4 Core and Core Fragments

There were four cores and one core fragment recovered from Cultural Level 2 (Table 7.1). A small fragment of a silicified siltstone pebble was recovered from unit 21S 8E (Catalogue #1974). It has been heavily heated, changing the colour to a dark red. This appears to be a bipolar core fragment. The bipolar percussion method is a common technique for splitting pebble cherts and silicified siltstones. A small grey banded chert core fragment was recovered from unit 18S 2E (Catalogue #3191). The fine quality material has allowed for small thin blade-like flakes to be removed from one side. The opposite side has a small sliver of white cortex remaining and has cracked poorly. This may be an early-stage biface reduction core. A large sandstone cobble from unit 19S 5E has had at least two large flakes removed from one face at opposite ends (Catalogue #4193). Intense heat has changed the colour to a reddish-orange. Heat-treatment improves the ability to knap sandstone, normally a poor material to flake. A grey Swan River chert core is an egg-shaped cobble-core found in unit 20S 9E (Catalogue #5062).

At least three flakes were removed unidirectionally from the apex, all resulting in step fractures. Large vugs and poor quality flakes may have deterred the original flintknapper from further use. The final core is a white vein quartz multidirectional core (Catalogue #5633). At least six flakes have been removed from along four edges of a cortex platform.

Table 7.1 Level C2 Core and Core Fragments.

Cat. #	Unit	Mass (g)	Material	Core Type
#1974	21S 8E	6.4	Silicified siltstone pebble	Indeterminate/Bipolar Core
#3191	18S 2E	15.6	Grey banded chert	Multidirectional Core Fragment
#4193	19S 5E	1,607.2	Sandstone (heat-treated)	Tested Cobble
#5062	20S 9E	263.0	SRC (grey)	Regular Platform Core
#5633	22S 9E	106.7	Quartz	Multidirectional Platform Core

7.3.5 Debitage

Table 7.2 Level C2 Lithic Debitage Types.

Material Type	Primary	Secondary	Tertiary	Shatter	Total	%
SRC	4	18 (H/T: n=11)	51 (H/T: n=30)	19 (H/T: n=8)	92 (H/T: n=49)	40.7
Chert (white, grey, tan, yellow, black, red)	2	9 (H/T: n=2)	42 (H/T: n=7)	11 (H/T: n=1)	64 (H/T: n=10)	28.3
Cathead chert	-	-	-	1	1	.4
Agate	-	-	1	-	1	.4
Basalt	1	3	6	4	14	6.2
Chalcedony	-	1	5	1	7	3.1
Jasper	-	-	1	-	1	.4
KRF	-	-	4	-	4	1.8
Quartz	-	4	1	5	10	4.4
Quartzite	-	1	1	4	6	2.7
Sandstone	-	1 (H/T: n=1)	-	2	3	1.3
Silicified peat/Sard	-	2		6	8	2.8
Silicified siltstone	1 (H/T: n=1)	-	-	-	1	.4
Siltstone	1	-	1	-	2	.9
Siltstone (Feldspathic)	-	1	10	1	12	5.3
Total	**9**	**40**	**123**	**54**	**226**	**100%**
% Total	**4.0**	**17.7**	**54.4**	**23.9**	**100%**	
H/T = Heat-treated; Total Amount of Heat-treated Debitage = 61						

A total of 226 pieces of debitage was recovered from the second level (Table 7.2). The most common material type is Swan River chert, which comprises over 40.7% of the total debitage. Various other cherts make up most of the remaining debitage (28.7%).

Twelve other lithic types comprise the remaining debitage. Tertiary flakes are the most common debitage type comprising 54.4% of the total debitage. Shatter is next most common at 23.9%, followed by secondary flakes at 17.7%. Only a small number of primary flakes are represented (4.0%). This pattern suggests that the people occupying this level were resharpening and reworking tools.

7.3.6 Fire-Cracked Rock

There is a large quantity of FCR recovered from this level. In total, 371 pieces of FCR were found with an average (mean) mass of 79.6 g. The majority of the material type by mass is granite at 25.7 kg (89.4%). The remaining 10.6% includes local igneous and metamorphic cobbles.

Table 7.3 Level C2 Fire-Cracked Rock

Material	Count	%	Mass (g)	%
Granite	322	87.7	25,715.0	89.4
Gneiss	10	2.7	1,338.5	4.7
Gabbro	1	.3	25.7	.1
Quartzite	6	1.6	626.2	2.2
Schist	11	3.0	569.7	2.0
Basalt	1	.3	53.4	.2
Sandstone	3	.8	434.3	1.5
Total	**371**	**100%**	**28,762.8**	**100%**

7.4 Cultural Level 2 Faunal Assemblage

7.4.1 Taxon and Element Identification

Cultural Level 2 contains the greatest volume of faunal remains at the site. A total of 14,441 specimens was recovered, with a combined mass of 28,808.8 g (Table 7.4). Four taxa were identified to species or family level, comprising 25.4% of the assemblage. The remaining faunal specimens are included in more general classifications of order or class.

Once again, bison (*Bison bison*) remains predominate, comprising 23.9% of the total assemblage, or 3,518 specimens. Other identified remains represent a single individual from each of the following taxa: Richardson's ground squirrel (*Spermophilus richardsonii*), the family canidae (wolves, dogs, coyotes, and foxes), and the family cervidae (deer, elk, and antelope). Canid remains, which comprise 3.7% of the identifiable assemblage, are represented by 136 specimens. Identified canid elements

include skull and teeth fragments, a left ulna, and a right femur. An unfused centrum epiphysis from the atlas vertebral fragment indicates skeletal immaturity. The teeth fragments are suggestive of a large dog or wolf-sized individual. Cervid remains are represented by nine fragments of a tibia shaft, whereas the ground squirrel is represented by a single mandible specimen.

Table 7.4 Level C2 Faunal Taxa

Taxon	NISP	Mass (g)	MNI
Bison bison	3,518	22,152.0	10
Spermophilus richardsonii	1	.2	1
family Canidae	136	71.7	1
family Cervidae	9	12.4	1
order Artiodactyla	1,635	599.8	-
class Mammalia	9,142	5,972.7	-
Total	**14,803**	**29,428.7**	**13**

Analysis indicates that there were at least ten bison identified in this level. All four limbs and axial elements are represented at least partially, with a higher number of skull fragments, carpals, tarsals and metapodial elements present. The most frequently represented elements are the petrous portion of temporal and talus, both with an MNE of ten from the right side; eight and seven respectively, from the left side. Skull fragments are highly represented, with an NISP of 626, or 17.8% of the identified bison by count.

7.4.2 Taphonomy

Burning is the most significant taphonomic process in this level, with 12.2% of the assemblage burned and .5% calcined (Table 7.5). Burned elements are found throughout most of the level, with a greater concentration to the west, particularly in units 21S 4E and 22S 4E. Calcined bone is more sparsely distributed, but with a greater concentration in units 22S 4E and 22S 5E. Cut marks are noted on 19 elements including a mandible, radius, scapula, femur, rib and several metapodials. This level contains the greatest number of cut marks observed in a level at Meewasin Creek. Two bones exhibit carnivore and rodent gnawing and two have carnivore punctures, likely from canids. A number of humerus, tibia, and metapodial shafts show evidence of green fracture and impact marks. Some bones in this level have partial staining from the dark chernozemic soil matrix.

Table 7.5 Level C2 Taphonomy.

	Unburned		Burned		Calcined		Cut Marks	Other Marks
Type	**NISP**	**Mass (g)**	**NISP**	**Mass (g)**	**NISP**	**Mass (g)**	**NISP**	**NISP**
Bone	10,244	25,566.2	1763	813.2	76	11.4	19	4
Enamel	1,735	1,867.1	313	47.3	-	-	-	-
Bone/ Enamel	310	503.6	-	-	-	-	-	-
All	**12,289**	**27,936.9**	**2,076**	**860.5**	**76**	**11.4**	**19**	**4**

7.5 Cultural Level 2 Pottery

There were two small pottery sherds found in Level C2 within a metre of each other horizontally and 11 cm vertically. The structure of both sherds are similarly layered and made with a compact paste that is primarily sand-tempered, with some added crushed granite grit. The surface textures are significantly different suggesting that they are not from the same vessel (Figure 7.3).

The first sherd is a rimsherd with straight profile (Catalogue #4783). The flat lip is sub-rounded exteriorly and sub-angular interiorly. Part of the rim has been slightly pinched, yet is thicker in other portions of the sherd. The exterior texture is plain with rough grit visible, whereas the interior is smooth with thumb imprints. The rim profile and smooth texture is indicative of Avonlea Plain Ware (Meyer and Walde 2009:63-64). This pottery type is found throughout the Northern Plains in small quantities. It is believed to be a smoothed version of other Avonlea textured wares.

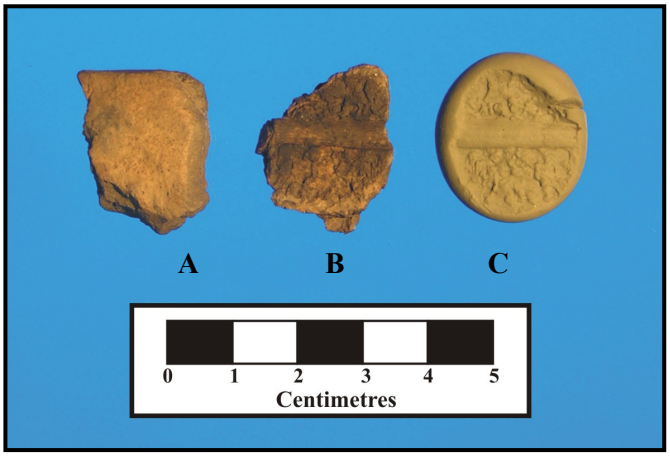

Figure 7.3 Level C2 Pottery Sherds. (A = Rimsherd; B =Net-impressed sherd; C = Net impression in relief)

The second sherd is a net-impressed body sherd with a trailing line across the sherd (Catalogue #4595). The texture and decoration suggests it is Rock Lake Net-impressed Ware, representing a conoidal vessel distinguished in Avonlea horizon sites (Meyer and Walde 2009:53-59). The presence of the incised line suggests the sherd is from near the lip, as a trailed line or row of punctates is common in this type of ware (Dyck 1983:123). Rock Lake Net-impressed Ware originated in the Eastern Woodlands, extending from central Minnesota through to southern Alberta, and in Saskatchewan, it is more commonly found within the parkland ecoregion (Meyer and Walde 2009:53).

7.6 Cultural Level 2 Features

There were two hearth features and a rock pit observed in this level. The first feature (Feature 2-1) is a large, ephemeral hearth within the southeast quadrant of unit 22S 4E and the southeast quadrant of 22S 5E. The hearth is evident by the presence of FCR, charcoal, burned and calcined bone, and a dark stained soil that was difficult to differentiate in the floor or south wall profile. The hearth feature is approximately 60 cm in diameter. Unburned bone fragments are scattered within the hearth and surrounding units. Large bones recovered include an innominate, a scapula, a femur and vertebrae. Some debitage is present in unit 22S 4E, but not significantly more than what was recovered from other units.

Feature 2-2 is located three metres northeast of Feature 2-1, primarily in the northeast corner of unit 20S 6E and the southeast corner of 19S 6 E. This smaller hearth is approximately 45 cm wide. Unburned, burned and calcined bone was present within the hearth and surrounding units, as well as FCR and chipping debris. The pottery sherds were both found within a metre of this feature.

A rock pit feature was first noticed near the bottom of Level C1, on the east side of units 19S 0E and 20S 0E. The pile of cobbles continued through Level C2, ending at Level C3. Feature 2-3 contains several natural cobbles and two FCR in a concentrated region with multiple long bone fragments and debitage. Cobbles consist of dolomite, granite and quartzite – all common in the area. Charcoal, burned bone and burned enamel fragments were collected from the feature. No debitage was found nearby. The

rock pit is unlikely natural, but rather represents a purposeful effort to deposit stones in one local.

7.7 Interpretation of Cultural Level C2

Cultural Level 2 has a greater number of cultural remains than any other level at the site with a total of 17,555 specimens. Figure 7.5 illustrates the spatial distribution of archaeological remains from this level. The region between the two hearth features contains one of the highest concentrations of archaeological remains consisting of FCR, pottery, and debitage, but predominantly faunal specimens. Another dense bone cluster is within the southern half of unit 17S 3E, where a high proportion of carpals and tarsals were recovered. This is near Test Pits 3A and 3B where a Swan River chert debitage scatter and multiple bone fragments including lynx were found.

The expedient butchering tools present and the high number of distal limb elements of bison indicates this was likely a kill site. Associated processing activities are recognized by the presence of pottery sherds, hearths, and burned and calcined bone. Expedient tools, hammerstones and the grooved maul are indicative of early stage bison processing. Evidence for at least ten bison within the site suggests a multiple kill event and possibly multiple events within the cultural level. The basin-shaped topography of the site is an ideal location for a pound. The hillslope is moderately sloped, whereas a steeper hill is needed for a jump. No postholes were noted although the pound structure may have been supported by piles of rocks such as Feature 2-3.

Unfortunately, no projectile points were recovered from this level which is unusual for a kill site. This means that any points used within the site were retrieved or discarded outside the boundaries of the excavation block. This lack of diagnostic tools makes assigning a cultural affiliation to the occupation difficult, but the identified pottery sherds indicate that the site dates from the initial Late Precontact period. Pottery types encompass both Rock Lake Net Impressed and Avonlea Plain Ware types, both recognized within the Avonlea Horizon (Meyer and Walde 2009:53). These pottery types correspond with the calibrated radiocarbon age of 1660 ± 46 that is cautiously attributed to this level.

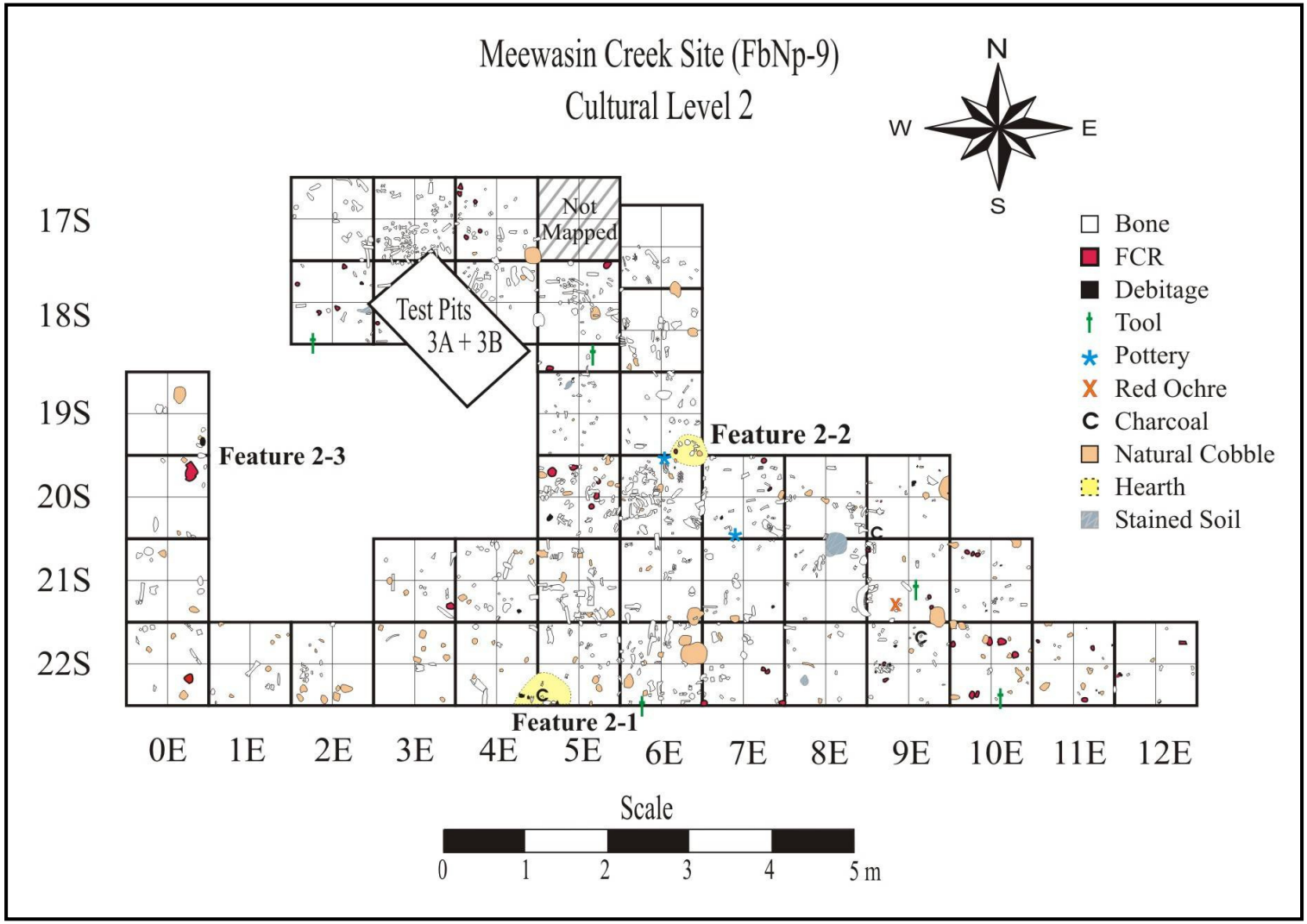

Figure 7.4. Distribution of Artifacts, Ecofacts, and Features in Level C2.

Chapter 8
Cultural Level 3

8.1 Introduction to Cultural Level 3

Cultural Level 3 (C3) is a Terminal Middle Precontact occupation found within a black, organic-rich loamy layer that extends continuously across the excavation block directly below Level C2. In general, Level C2 artifacts were found near the top of a thick buried soil, and Level C3 artifacts were found near the bottom. The level is approximately 7 to 20 cm thick and is buried from 22 to 40 cm below surface in the west and 44 to 60 cm in the east (Figure 5.2). Arbitrary levels were employed to differentiate the levels during excavation. Level C3 is slightly darker and has minor differences in sediment size, but sediment from both levels was deposited as a result of hillslope processes (Rutherford 2004).

Archaeological evidence suggests the site was used as a small-scale bison kill and processing area. Diagnostic artifacts indicate the site was occupied during the Late Precontact, and possibly within the transitional Terminal Middle Precontact period. A radiocarbon assay indicates Level C3 has an uncalibrated age of 2130 ± 125 B.P. (S-2366; Walker 1988:83).

A light coloured sandy loam layer underlies Level C3 from 5 to 20 cm thick. Below this is the partial Level C3A (Chapter 9). It is necessary to discuss levels C3 and C3A separately because there is no evidence to suggest continuity.

8.2 Cultural Level 3 Lithic Assemblage

8.2.1 Projectile Points

The cultural affiliation associated with occupation C3 is puzzling, and the three projectile points found do not offer a harmonious explanation (Figure 8.1). The first is a poorly flaked point made of grey chert from unit 18S 6E at 44 cm below surface (Catalogue #4053). The basal edge is unifacially retouched straight. One notch is placed

at the corner; the other along the side. The surface is covered with multiple step fractures. The morphology is irregular, but shares characteristics with what Dyck (1983:107-108) calls the "un-named complex," a point typology found at sites dating around 2500 B.P. A more detailed discussion of this complex and its relationship with contemporaneous cultures will continue in Chapter 13.

The second specimen, retrieved from unit 17S 5E at a depth of 47 cm below surface, is classified as a point preform or a triangular unnotched point (Catalogue #3047). The base is concave and the material is a poor quality Swan River chert that appears to be heat-treated. Triangular points have been found throughout the Northern Plains in the Late Precontact, often in association with Prairie and Plains Side-notched points. In his analysis of unnotched points from archaeological sites across North America, Christenson (1997:139) was unable to determine a universal functional explanation for the presence of unnotched projectile points in regards to the type of animal hunted, temporal change, or cultural affiliation. The specimen is asymmetrical with a triangular cross-section, which presents the possibility that the item does not represent a projectile point, but rather a tool

The third point is a Swan River chert midsection from unit 22S 8E at 41 cm below surface (Catalogue #2246). It is well formed, symmetrical, with a bi-convex transverse cross-section. Although it is missing both the tip and base, it appears to be notched. The triangular shape is reminiscent of Pelican Lake, but as it is lacking diagnostic features, it is impossible to assign to a cultural complex with any certainty.

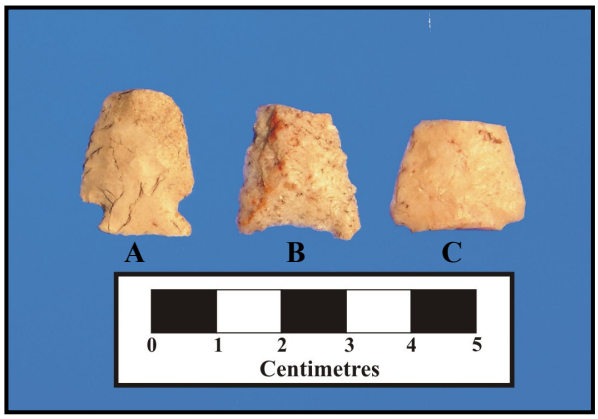

Figure 8.1 Level C3 Projectile Points. (A = Cat. #4053; B = Cat. # 3047; C = Cat. #2246)

8.2.2 Unformed Tools

Two hammerstones were recovered from Cultural Level 3. The first is a large sub-spherical, fine-grained granite cobble with one flattish side (Catalogue #3888). Evidence of moderate battering is present along an edge, and two small impact dents opposite. The cobble has reddish staining on one face. One hairline crack has begun to encircle the cobble. The second hammerstone is a rounded-tetrahedral shaped granite cobble with three impact scars on one face of the cobble (Catalogue #4048). The impacts are moderately affected marring the otherwise smooth surface of the cobble. The tools have a mass of 1107.8 g and 772.3 g, respectively.

A large quartzite cobble core with multiple flakes removed on one side also has a well worn indentation indicative of use as an anvil (Catalogue #2264). Found in unit 22S 8E it has a mass of 2108.7 g.

8.2.3 Flaked Stone Tools

In addition to the projectile points, there is a total of six flaked stone tools found in Cultural Level 3 (Figure 8.2). Two biface tools include a quartz fragment from unit 22S 12E (Catalogue #6232) and a basalt flake with bifacial thinning on one edge from unit 18S 5E (Catalogue #3692). A chalcedony primary flake is shaped like an endscraper preform (Catalogue #874). The most common tool type in this level are retouched flakes (n = 3). Retouched flakes are made of Swan River chert (Catalogue #793), heat-treated silicified peat (Catalogue #4900), and chalcedony (Catalogue #5548).

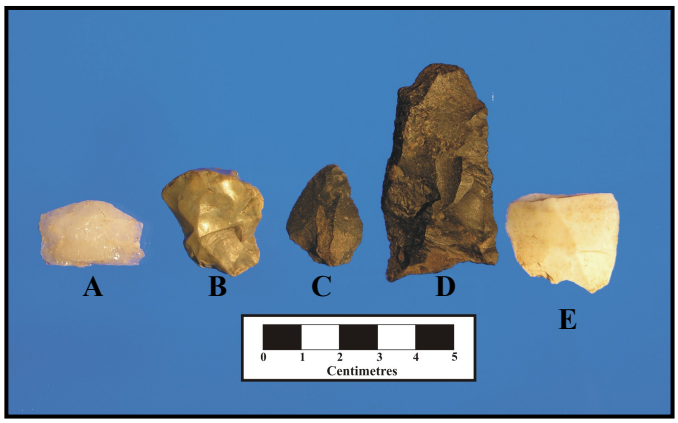

Figure 8.2 Level C3 Flaked Stone Tools. (A = Cat. #6232; B = Cat. #874; C = Cat. #3692; D = Cat. #4900; E = Cat. #5548)

8.2.4 Core and Core Fragments

A total of nine cores and two core fragments were found within Level C3 (Table 8.1). Two heat-treated Swan River chert core fragments were found together and possess similar colour and texture. Although they do not refit, they are from they same parent rock. One is a biface reduction core (Catalogue #4284a), and the other is an indeterminate core fragment (Catalogue #4284b).

Table 8.1 Level C3 Core and Core Fragments.

Cat. #	Unit	Mass (g)	Material	Core Type
#591	22S 1E	1,070.6	Quartzite	Multidirectional Platform
#735	22S 2E	296.8	SRC	Amorphous
#873	22S 3E	45.3	Indet. sedimentary	Amorphous Flake Core
#2264	22S 8E	2,108.7	Quartzite	Amorphous Core/Anvil
#2608	17S 3E	97.0	Quartz	Wedge Platform
#2857	17S 4E	70.8	SRC (heat-treated)	Multidirectional Platform
#3721	18S 5E	7.7	Chert pebble	Platform
#4240	19S 5E	190.9	SRC (heat-treated)	Amorphous
#4284a	19S 5E	56.2	SRC (heat-treated)	Biface Reduction Core Fragment
#4284b	19S 5E	30.6	SRC (heat-treated)	Fragment
#6038	22S 11E	2,522.2	Basalt	Multidirectional Platform

A large quartzite multidirectional core has at least six negative flake scars present (Catalogue #591). Part of the cortex of the cobble is present and has been used as the platform from several directions. A coarse Swan River chert core has at least one distinct negative flake scar, but all that remains is mostly a vug-filled cortex (Catalogue #735). An exotic sedimentary flake-core has three flakes removed from the dorsal side of the flake with distinct step fractures which occurred after the flake-core originated (Catalogue #873). The material is an unusual fine-grained sedimentary rock with small irregular chert inclusions. This was found in 22S 3E, and two pieces of debitage with similar characteristics have been found in units 18S 5E and 18S 6E. Two heat-treated Swan River chert core fragments fit together forming an expended multidirectional core (Catalogue #2857). A wedge-shaped quartz core has three flakes removed from both sides of a thin cortex platform (Catalogue #2608). The long edge may have been utilized, but the coarse quartz it difficult to distinguish if there is retouch along one side or it is simply fortuitous breakage. A small grey pebble chert core has a couple of small flakes removed from the dorsal side of the flake removing the thick white cortex (Catalogue

#3721). A heat-treated amorphous Swan River chert core has three to four flakes removed from both sides of the small cobble (Catalogue #4240). The material is poor quality and may have cracked further from heating. Step fractures are common. Three flakes have attempted to be removed from the smooth cortex side with limited success. The opposite side has coarse fractures. The largest cobble in this level is a large basalt core (Catalogue #6036). One plane has several flakes removed tri-directionally. Finally, as discussed above, a large quartzite multidirectional core/anvil was recovered (Catalogue #2264). Opposite to the anvil marks on the apex of the pyramidal shaped cobble there are at least nine negative flake scars.

8.2.5 Debitage

A total of 611 flakes and 108 pieces of shatter was recovered from the third cultural level (Table 8.2). The lithic debitage recovered in Level C3 is predominantly made up of various chert flakes and pieces of shatter (82.5%). Swan River chert comprises half of this amount (40.6% of the total), and basalt accounts for 5.8%. In less significant numbers, quartz, quartzite and Gronlid Siltstone each make up approximately two percent. The remaining six percent is comprised of 13 other material types, with fewer than 10 pieces of debitage per material type.

The variety of material types in this level is diverse. The majority continues to be local materials, but there is a significant representation of high quality materials such as cherts and chalcedony as well as a selection of exotic materials such as Knife River flint, and obsidian. Knife River flint originates in the Knife River Valley of northwestern North Dakota. Obsidian sources are in Wyoming and the Rocky Mountains, although the single tertiary flake in this level is not substantial enough to warrant source of origin analysis. The presence of obsidian in the Northern Plains is rare and is often associated with Pelican Lake assemblages (Dyck 1983).

The largest percentage of lithic debitage type is significantly tertiary flakes (n = 348 flakes at 41.8%). Nearly half as many secondary flakes are present (26%). Shatter makes up 15% and primary flakes are present in only 10% of the sample. The pattern reflects tool manufacturing and rejuvenation activity within the level.

Table 8.2 Level C3 Flaked Lithic Debitage.

Material Type	Primary	Secondary	Tertiary	Shatter	Total	%
SRC	36 (H/T: n=21)	102 (H/T: n=54)	122 (H/T: n=46)	32 (H/T: n=13)	292 (H/T: n=121)	40.6
Chert (white, grey, yellow, black)	19 (H/T: n=2)	61 (H/T: n=7)	187 (H/T: n=16)	34 (H/T: n=2)	301 (H/T: n=25)	41.9
Agate	-	-	1	1 (H/T: n=1)	2	.3
Basalt	-	9	8	25	42	5.8
Chalcedony	-	1	6	2	9	1.3
Jasper	1	1	2 (H/T: n=1)	-	4 (H/T: n=1)	.6
KRF	-	-	5	-	5	.7
Obsidian	-	-	1	-	1	< .1
Porcellanite	1	1	1	-	3	.4
Quartz	-	5	2	6 (H/T: n=1)	13	1.8
Quartzite	4 (H/T: n=1)	6	4 (H/T: n=1)	2	16 (H/T: n=2)	2.2
Sandstone	1	-	-	1	2	.3
Siltstone	1	-	-	-	1	.1
Siltstone (Feldspathic)	-	-	-	1 (H/T: n=1)	1 (H/T: n=1)	.1
Siltstone (Gronlid)	9	-	1	1	11	1.5
Silicified Peat/Sard	1	1	3 (H/T: n=1)	2	7 (H/T: n=1)	1.0
Silicified Wood	-	2 (H/T: n=1)	2	-	4 (H/T: n=1)	.6
Silicified siltstone	-	1	1	-	2	.3
Indet. Exotic Sed.	2	-	-	1	3	.4
Total	**75**	**190**	**346**	**108**	**719**	**100%**
% Total	**10.4**	**26.4**	**48.1**	**15.1**	**100%**	
H/T = Heat-treated; Total Amount of Heat-treated Debitage = 151						

8.2.6 Fire-Cracked Rock

There is a total of 818 fire-cracked rocks in Level C3 with a mass of 30 kg (Table 8.3). FCR is distributed across the entire level. There is a greater concentration of FCR in the northern units, yet unit 22S 11E has the highest number of FCR fragments. The greatest proportion of FCR is granite with a total mass of 21.4 kg. Other compact, granular cobbles make up the remaining 29.6% by mass. Many of the larger cobbles have broken into smaller pieces resulting in a mean size of 36.7 g.

Table 8.3 Level C3 Fire-cracked Rock Divided by Material Type.

Material	NISP	%	Mass (g)	%
Granite	731	89.4	21,439.3	71.4
Basalt	2	.2	306.3	1.0
Gabbro	9	1.1	202.0	.7
Gneiss	35	4.3	5,719.2	19.0
Quartzite	16	2.0	349.6	1.2
Sandstone	12	1.5	333.3	1.1
Schist	6	.7	1,475.5	4.9
Indeterminate	7	.9	220.5	.7
Total	**818**	**100%**	**30,045.7**	**100%**

8.3 Cultural Level 3 Faunal Assemblage

Level C3 has significantly fewer faunal remains than the upper two levels. Ecofacts are in noticeably poorer condition which has made it difficult to determine species and element identification. Enough bone was recovered from this occupation in Test Pit 3A and B to determine an uncalibrated age of 2130 ± 125 B.P. (S-2366; Walker 1988:83). A second assay obtained from three combined faunal specimens was rejected.

8.3.1 Taxon and Element Identification

The number of identified specimens for this level is 5730 which has a combined mass of 6367.1 g. At least three species are represented in Level C3 by faunal remains from six individuals (Table 8.4).

Table 8.4 Level C3 Faunal Taxa.

Taxon	NISP	Mass (g)	MNI
Bison bison	1,700	4,371.7	4
Canis sp.	24	11.4	1
order Artiodactyla	495	229.7	-
order Rodentia	5	.1	1
class Mammalia	3,496	1,753.7	-
Unidentified	10	.5	-
Total:	**5,730**	**6,367.1**	**6**

Bison remains represent at least four individuals. The NISP for bison is 1700 which accounts for 29.7% of the assemblage in this level. The highest NISP of elements includes maxilla and maxillary teeth, talus, and carpals. The highest fragmentation of bones is the skull, which is consistent with the fragmentary nature of the skull. Enough

collagen was recovered to obtain a radiocarbon date from the combined bison remains of a distal humerus, humerus shaft, and tibia shaft fragments from units 21S 5E and 21S 0E.

Canid remains from Level C3 consist of fragments of a right mandible including the condylar process, and a worn carnassial still intact in the bone. Based on the tooth size and the considerable wear and decay, the elements represent a mature animal, either a smaller, female wolf (*Canis lupus lupus*) or domestic dog (*Canis lupus familiaris*). Because of the fragmentary nature of the element, it is difficult to more precisely identify to species.

A single fragmented rodent incisor was recovered in this level. The size is consistent with ground squirrel, which are very common in the area. Faunal remains that could not be identified to a greater taxonomic classification include artiodactyls (8.6%), mammals (61.0%), and unidentified remains (.2%).

8.3.2 Taphonomy

Burning is the most recognized taphonomic mark on the faunal remains (Table 8.5). In Level C3, 8.2% of the specimens are burned and 2.2% are calcined. Only three bones exhibit cut marks. These are slight incisions noted on a bison tibia shaft sent for radiocarbon dating; the superior edge of a bison scapula and an indeterminate mammal bone fragment with two deep marks. Additionally, a bison metatarsal fragment exhibits carnivore gnaw marks. The majority of remains from this level are stained from the dark organic-rich soil.

Table 8.5 Level C3 Taphonomy.

	Unburned		Burned		Calcined		Cut Marks
Faunal Type	**NISP**	**Mass (g)**	**NISP**	**Mass (g)**	**NISP**	**Mass (g)**	**NISP**
Bone	4,055	5,151.1	388	190.9	120	14.8	3
Enamel	694	726.8	81	33.7	7	.5	-
Bone/Enamel	385	249.3	-	-	-	-	-
All	5,134	6,127.2	469	224.5	127	15.3	3

8.4 Cultural Level 3 Pottery

Three small pottery sherds representing at least one vessel were found scattered across Level C3 (Figure 8.3). The first is a small shoulder sherd with a curved profile (Catalogue #2830). The sherd is comprised of a well consolidated layered paste with

medium-fine crushed granite. The second sherd is quite thick with a smooth angular convex side, suggesting it is from the interior of the neck region (Catalogue #5529). The exterior surface has exfoliated exposing coarse grit and sand temper. The third sherd (Catalogue #1270) is light-coloured with large, coarse grit-temper in a predominantly fine sandy paste. One side, most likely the interior surface, is very smooth and flat with some trowel trauma evident; the opposite side has exfoliated. Cultural affiliation is difficult to determine because of the poor preservation and small size of the specimens. No pottery was found below Level C3.

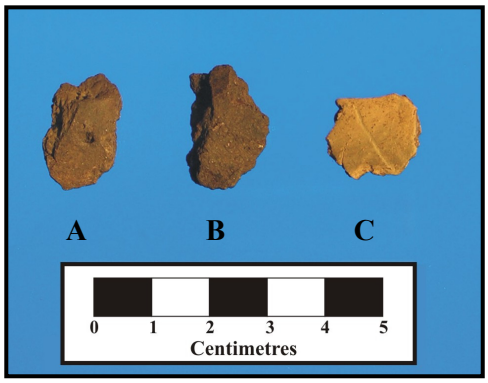

Figure 8.3 Level C3 Pottery Sherds. (A = Cat. #2830; B = Cat. #5529; C = Cat. #1270)

8.5 Cultural Level 3 Features

Two general features are noted in Level C3. Feature 3-1 is a heavy concentration of artifacts and ecofacts in the northeast quadrant of unit 18S 4E, and spreading out to neighbouring quadrants. It appears to be a bison butchering activity area with multiple bones and flakes present. Tools such as a hammerstone, projectile point and retouched flakes were discarded to the east. Multiple tertiary flakes indicate the resharpening of tools during processing. The pottery sherd was found within the cluster to the northwest. A high proportion of charcoal was found in units 18S 4E and 18S 5E. Although artifacts suggest the presence of a hearth nearby, the soil changes within the area indicates that a rodent burrow crosses through.

Feature 3-2 is a gravel concentration in units 21S 7E and 21S 8E below Level C3, but above Level C3A. It appears to be a natural occurrence but dark staining, likely rodent activity, continues to the east and deeper into Level C3A.

Rodent disturbances are common in this level. The presence of a metal fragment in krotovina within unit 18S 3E emphasizes the difficulty in maintaining discrete stratigraphy. Larger disturbances are noted in units 22S 1E, 22S 3E, 21S 9E, and 18S 4E.

It is interesting to note that despite the occurrence of charcoal and burned bone throughout the excavation block, no hearth features were observed. There is a higher incidence of charcoal in units 20S 6E, 21S 3E, 21S 4E, and 22S 8E.

8.6 Interpretation of Cultural Level C3

The archaeological assemblage from Cultural Level C3 represents multiple activities related to a small-scale bison kill and processing site. Figure 8.4 illustrates the distribution of mapped artifacts and features in Level C3.

At least four bison were killed in the vicinity represented by a number of discarded distal limb elements, skull fragments, and other faunal remains. No evidence of a pound structure was recovered, but that does not preclude the existence of one nearby.

The presence of hammerstones, an anvil, and coarse, expedient tools indicates early stage bison processing. There is a high diversity of lithic material types suggesting that multiple tools were manufactured and utilized, but the scarcity of tools found implies that finished tools were carried away or discarded beyond the excavation boundaries.

The archaeological cultural affiliation and time frame is difficult to determine for this level. The three poorly preserved pottery sherds found in this level cannot be attributed to a cultural affiliation. The calibrated radiocarbon age of 1660 B.P. (BSG 2742) was rejected as the composite sample was compromised with Level C2 bone, and the age fits best with Level C2. The second assay for Level 3 has a calibrated age of 2090 ± 275 B.P. (S-2366). The projectile points recovered in this level provide an important key to cultural identity, but the fragmentary nature causes identification challenges. The most complete point (Catalogue # 4053) is best attributed to the un-named or Outlook complex. A more thorough discussion of contemporaneous cultures will be discussed in Chapter 13.

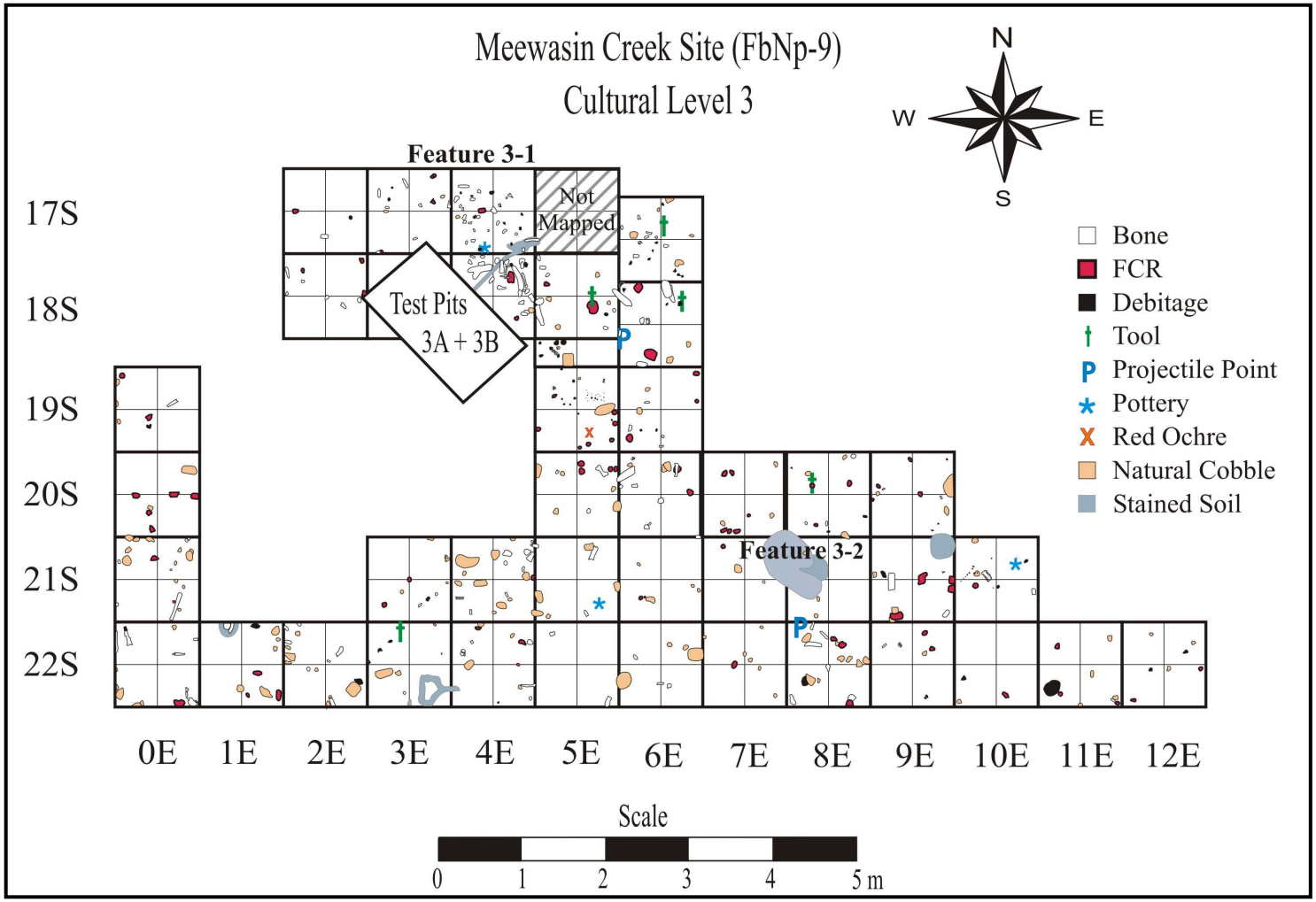

Figure 8.4 Distribution of Artifacts, Ecofacts and Features in Level C3

Chapter 9
Cultural Level 3A

9.1 Introduction to Cultural Level 3A

Cultural Level 3A (C3A) is recognized by a lenticular sandy loam buried soil that extends over the eastern portions of the excavation block. The level began appearing in unit 21S 6E, and extended further east, north, and northwest. The thickness of the level is about 13 cm, and it lies within 40 to 85 cm below surface. In the south profile (Figure 5.2), the level tapers off westward in unit 22S 7E at a depth of 55 cm below surface, but further north in unit 17S 3E the level is buried only 40 to 53 cm below surface. Level C3A and deeper levels were excavated by following the distinct sediment changes in colour and texture that distinguish buried soils from sandy hillslope deposition.

A projectile point from Level C3A is diagnostic of the Sandy Creek complex, a culture that dates from 2750 to 2150 B.P. (Morlan 1988:306). The age of the point corresponds with a radiocarbon assay indicating the age of the occupation level is 2405 ± 45 B.P.; 2360 cal B.P.

9.2 Cultural Level 3A Lithic Assemblage

9.2.1 Projectile Point

A single projectile point was found in Level C3A, in unit 17S 4E, 44 cm below surface. The thick chert side-notched point is identified as belonging to the Sandy Creek complex (Figure 9.1; Catalogue #2896). The nearly complete point is only missing potions of the chipped “ears” of the base, although the shape of the thinned convex base is still evident. The asymmetrical shape of the body suggests the tool was reworked.

Figure 9.1 Level C3A Sandy Creek Projectile Point.

9.2.2 Unformed Tools

In unit 17S 4E at 71 cm below surface, a large oblong sandstone cobble was recovered with a mass of 1638.0 g (Catalogue #2895). A large flat facet extends across most of the length of the cobble. The facet shows evidence of crushing and wear consistent with use as a grinding stone. No hammerstones or other unformed tools were found in were found in Level C3A.

9.2.3 Flaked Stone Tools

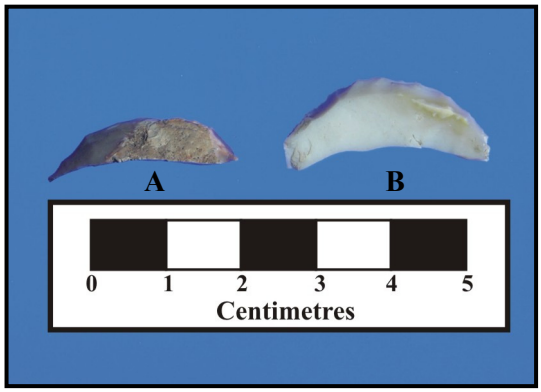

Figure 9.2 Unifacially Flaked Tool Fragments.
(A = Cat. #3730; B = Cat. #3784)

Level C3A contains five flaked tools, the majority of which are only fragments. One heat-treated chert tool fragment is bifacial and the rest are unifacial (Catalogue #3472). A white chert endscraper fragment was found in unit 18S 5E (Figure 9.2; Catalogue

#3784). From the same unit is the distal convex working edge of a Swan River chert unifacially retouched tool fragment (Figure 9.2; Catalogue #3730). A Swan River chert retouched flake is a possible spokeshave fragment with a concave working edge (Catalogue #3920). Finally, a primary quartzite flake has unifacially retouch (Catalogue #1275).

9.2.4 Core and Core Fragments

Only one core and two core fragments were found in Level C3A (Table 9.1). One Swan River chert core fragment has large vugs and reddening due to heat-treatment (Catalogue #4379). The second Swan River chert core fragment was not heat-treated, but a thick white cortex is present (Catalogue #2650).

A large sandstone multi-directional core that has been extremely heat-treated to a dark red colour was recovered from unit 17S 3E (Catalogue #2676). It shows evidence of multiple flake removal, particularly two from opposite sides of a platform. Three pieces of shatter and three flakes of the same well heated material were found in the same unit. One of the flakes refits with the core.

Table 9.1 Level C3A Core and Core Fragments.

Cat. #	Unit	Mass (g)	Material	Type
#2650	17S 3E	22.7	SRC	Fragment
#2676	17S 3E	669.0	Sandstone (heat-treated)	Multidirectional Platform
#4379	19S 6E	29.8	SRC (heat-treated)	Fragment

9.2.5 Debitage

Although Level C3A extends across only two thirds of the excavation area, the level contains half as much debitage as Level C3. Table 9.2 details the debitage found in Level C3A. The debitage pattern is similar with chert and Swan River chert making up the majority of the material type (254 pieces; 82.5%). Less dominant materials include 18 pieces of chalcedony (5.8%) and 11 pieces of silicified peat (3.8%). Nine other material types are represented by fewer than 10 flakes or shatter each, making up the remaining 8.1%. The most frequent debitage type is tertiary flakes (64.6%). Less frequent are secondary flakes (18.5%), shatter (12.3%), and primary flakes (4.5%). This trend is consistent with tool use and rejuvenation.

Table 9.2 Level C3A Flaked Lithic Debitage.

Material Type	Primary	Secondary	Tertiary	Shatter	Total	%
SRC	7 (H/T: n=2)	30 (H/T: n=17)	70 (H/T: n=46)	12 (H/T: n=5)	119 (H/T: n=70)	38.6
Chert (white, grey, brown)	2 (H/T: n=1)	23 (H/T: n=14)	98 (H/T: n=44)	12	135 (H/T: n=59)	43.8
Agate	-	-	1	-	1	.3
Chalcedony	1	1	16 (H/T: n=1)	-	18 (H/T: n=1)	5.8
Jasper	-	-	-	1	1	.3
KRF	-	-	4	-	4	1.3
Quartz	-	-	5	-	5	1.6
Quartzite	3	-	-	1	4	1.3
Sandstone	-	2 (H/T: n=2)	-	3 (H/T: n=3)	5 (H/T: n=5)	1.6
Siltstone (Gronlid)	-	-	1	-	1	.3
Silicified Peat/Sard	-	1	4	6	11 (H/T: n=1)	3.6
Silicified siltstone	1	-	-	-	1	.3
Indet. Exotic Sediment	-	-	-	3	3	1.0
Total	**14**	**57**	**199**	**38**	**308**	**100%**
Percent Total	**4.6**	**18.5**	**64.6**	**12.3**	**100%**	
H/T = Heat-treated; Total Amount of Heat-treated Debitage = 136						

9.2.6 Fire-Cracked Rock

Table 9.3 Level C3A Fire-cracked Rock Divided by Material Type.

Material	Count	%	Mass (g)	%
Granite	102	40.6	6,833.2	49.0
Basalt	12	4.8	36.2	.3
Gabbro	11	4.4	1.9	< 0
Gneiss	1	.4	31.3	.2
Quartzite	2	.8	338.2	2.4
Sandstone	2	.8	1.9	< 0
Siltstone	2	.8	1.2	< 0
SRC	9	3.6	15.2	.1
Indeterminate	110	43.8	6,693.4	48.0
Total	**251**	**100%**	**13,952.5**	**100%**

Level C3A has a total of 251 fire-cracked rocks with a mass of 14.0 kg (Table 9.3). Sixteen granite cobbles and four indeterminate coarse-grained cobbles make up the majority of larger cobbles, defined as over .5 kg in mass. Small pebbles of burned basalt,

gabbro, gneiss, quartzite, sandstone, siltstone, and Swan River chert make up the remaining FCR fragments.

A large concentration of an indeterminate black and white granular rock located in unit 18S 4E appears to be fire-cracked. A large dolomite cobble in the same unit is stained orange on some edges, suggesting it was subjected to heat-treatment. The indeterminate rock cluster is approximately equal by count and mass with granite FCR found scattered throughout the level. The mean cobble size is 55.6 g.

9.3 Cultural Level 3A Faunal Assemblage

9.3.1 Taxon and Element Identification

A total of 4,390 specimens was recovered from Level C3A. The greatest percentage of faunal remains fall within the general mammal category at 76.1% (Table 9.4). Ungulates comprise 19.0% and unidentified specimens are .9% of the total assemblage. Three limb bones of an unidentified small bird were recovered in this level.

Analysis reveals that a total of 172 bison remains account for 3.9% of the assemblage, by count, which represents at least one animal. Bison elements include skull fragments, right and left humerus, right metacarpal, and a right talus.

Table 9.4 Level C3A Faunal Taxa.

Taxon	NISP	Mass (g)	MNI
Bison bison	172	659.7	1
order Artiodactyla	836	255.6	-
class Mammalia	3,339	518.5	-
class Aves	3	.2	1
Unidentified	40	.9	-
Total	**4,390**	**1,434.9**	**2**

9.3.2 Taphonomy

Burning is the most recognized taphonomic mark on the faunal remains: 15.8% are burned and 8.8% are calcined (Table 9.5). No cut marks or other cultural modifications are recognized on Level C3A remains. A number of faunal remains are stained from the dark organic-rich soil.

Table 9.5 Level C3A Taphonomy.

	Unburned		Burned		Calcined		Cut Marks
Faunal Type	**NISP**	**Mass (g)**	**NISP**	**Mass (g)**	**NISP**	**Mass (g)**	**NISP**
Bone	2,659	1,095.4	595	41.9	386	35.2	-
Enamel	651	248.6	97	13.8	2	.1	-
All	3,310	1,344.0	692	55.7	388	35.3	0

9.4 Cultural Level 3A Features

Three features are noted in Level C3A. Feature 3A-1 is a dense concentration of cobbles, some of which are heated and fire-cracked. Located in units 17S 6E and 18S 6E it continues into the east wall and west to unit 18S 4E. Figure 9.3 shows how the cobbles are tightly clustered. Tools such as an endscraper, possible spokeshave and the Sandy Creek point were all found in the vicinity. Although cobbles of various sizes are noted in the area, the localized concentration indicates a purposeful deposition for use or refuse. The collection of cobbles may indicate a small operation requiring great heat. No hearths were observed in the vicinity, but may be located outside the boundaries of the excavation block, or were too ephemeral to have been noticed.

Figure 9.3 Feature 3A-1 Units 17S 6E – 18S 6E.

Feature 3A-2 refers to the dark staining in unit 21S 8E. It is likely a continuation of the rodent disturbance from Feature 3-2.

Feature 3A-3 is a basin-shaped hearth feature located within in the southeast quadrant of unit 22S 9E, extending into the southwest quadrant 22S 10 E, and continuing into the south wall. The feature measures approximately 55 cm in diameter and 15 cm deep. A concentration of burned and calcined bone fragments corresponds with the feature. This feature may represent a cooking area within a scatter of processed faunal remains.

9.6 Interpretation of Cultural Level 3A

Level C3A represents the remainder of a buried soil that was partially eroded by hillslope processes. Figure 9.4 shows the distribution of mapped artifacts, ecofacts and features within the units where C3A is present. Archaeological remains indicate that this occupation was a short-term site such as a campsite with multiple, specialized activities.

The high numbers of burned, calcined and fragmented faunal remains indicates later stage bison processing occurred, with associated hearth(s) and tool manufacture and rejuvenation. The grinding stone present was likely used for plant or meat pulverizing. The small amount of cores found and the majority of debitage is comprised of tertiary flakes indicates that there was more tool rejuvenation than manufacture. The few tools recovered are well used as only fragments were discarded.

The singular projectile point from this level clearly resembles a Sandy Creek point. The Sandy Creek complex in Saskatchewan dates from 2750 to 2150 B.P. (Morlan 1988:306). A calibrated radiocarbon date of 2360 ± 50 years B.P. was obtained from charcoal (BGS 2740). The radiocarbon date matches well with the cultural affiliation. A discussion of the Sandy Creek culture will be continued in Chapter 13.

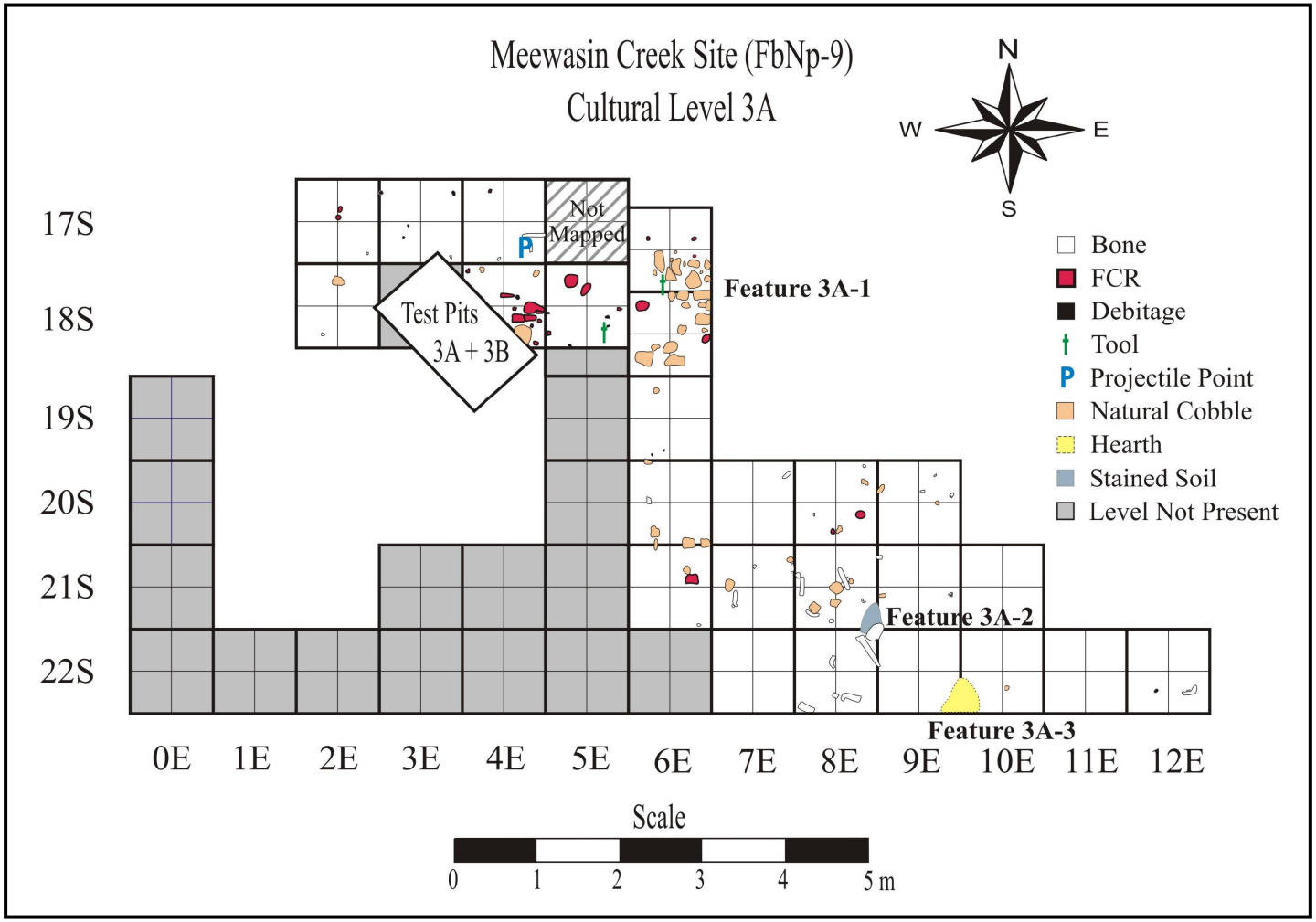

Figure 9.4 Distribution of Artifacts, Ecofacts and Features in Level C3A.

Chapter 10
Cultural Level 4

10.1 Introduction to Cultural Level 4 (4A and 4B)

Cultural Level 4 is a Terminal Middle Precontact occupation layer within a gently sloping, organic-rich, sandy loam matrix. Level C4 is separated from Level C3A above by a light coloured sandy loam layer, and separated from Level C5 below by lighter coloured loamy sand (Figure 5.2). Level C4 extends across the excavation block in all units. In the middle of the block the level divides into Level C4A above and Level C4B below separated by a sterile loamy sand layer. Level C4 is approximately 15 cm thick in the west at a depth of 45 to 60 cm below surface. At the eastern extent of the block the depth of Level C4A is 92 to 98 cm below surface and Level C4B is 102 to 113 cm below surface. Figure 10.1 illustrates the units that were excavated as one condensed level (C4) or as separate levels (C4A and C4B). Because of the separation in the eastern portion of the excavation block, it is appropriate to look at Levels C4A and C4B separately from the combined Level C4 stratum.

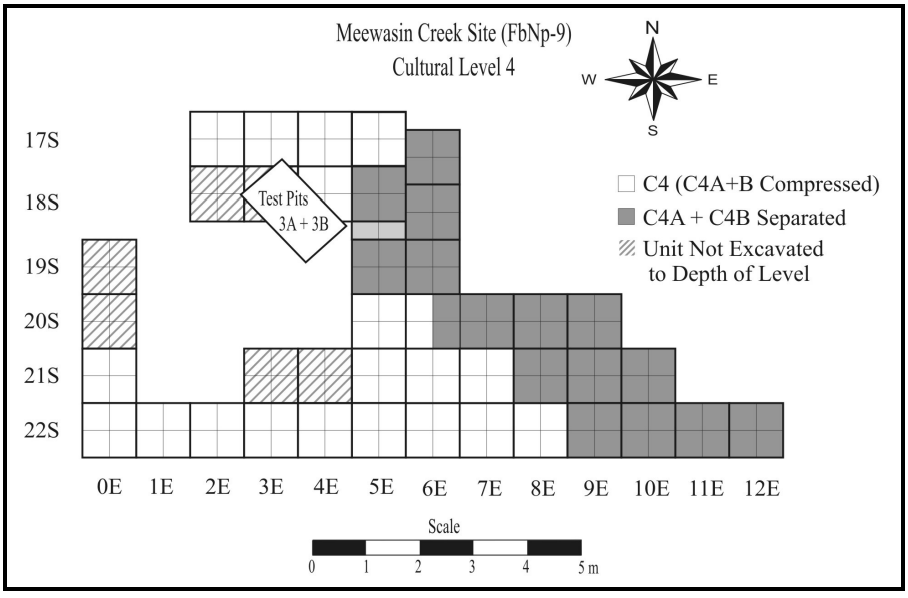

Figure 10.1 Cultural Level 4 (C4A + C4B).

Level C4A is classified as a Pelican Lake occupation based on the presence of a diagnostic projectile point. A radiocarbon sample consisting of four bison shaft elements from Level C4B obtained a chronometric age of 2286 ± 70 B.P.; 2340 ± 70 cal B.P. (BSG 2743). The presence of a possible McKean point within the combined Level C4 suggests an earlier occupation. Included in the analyzed assemblage are lithic and faunal remains.

10.2 Layer between C3A and C4

Before discussing Level C4 artifacts, it is important to briefly mention the few cultural remains found in the interlayer between C3A and C4, all from within six units in the central and eastern portion of the excavation block. A large sandstone cobble was recovered from 22S 10E (Catalogue #5885). Debitage consists of two pieces of shatter from silicified peat and quartz. Nine FCR with a mass of .1 kg were found in units 22S 9E, 18S 4E, and 20S 9E. Faunal remains amount to 5 small unidentifiable fragments with a mass of 1.4 g. No features were observed.

10.3 Cultural Level 4 (A and B) Lithic Assemblage

10.3.1 Projectile Points

Three partial projectile points were recovered from Level C4 (Figure 10.2). As well, a chert point tip was recovered from Level C4A of unit 22S 11E.

A poorly made chert point was found in Level C4 unit 21S 5E (Catalogue #1277). The body shape is round aside from the tip that has broken and the base that is asymmetrically concave. The shape is similar to a McKean point. The point was recovered 65 cm below surface from within the condensed Level C4A and 4B, and therefore, cannot be attributed to a more specific occupation level.

In Level C4A a very well made midsection of a Pelican Lake point was recovered from unit 20S 7E at 66 cm below surface (Catalogue #4798). The tool is made of a good quality Knife River flint and is flaked so thinly as to be translucent. Flake scars are fairly uniform and angled straight and slightly oblique down both sides. The base has broken off at the notches and the tip has broken which makes interpreting the original size and

shape difficult. The point is finely made and the sides are straight, similar to Pelican Lake I, or what Kehoe (1974) calls the Large Classic variety.

The third point is unfinished and poorly made (Catalogue #5331). Located in 21S 9E, this tool shows evidence of hafting and bifacial thinning. Both the tip and the base have broken. The material is a poor-quality mottled grey-brown Swan River chert that may be slightly heat-treated. Only one edge is finished; multiple step-fractures may have discouraged finishing the other edge. The unfinished nature of the tool makes it difficult to assign to a cultural affiliation, but may belong to the Duncan/Hanna phase.

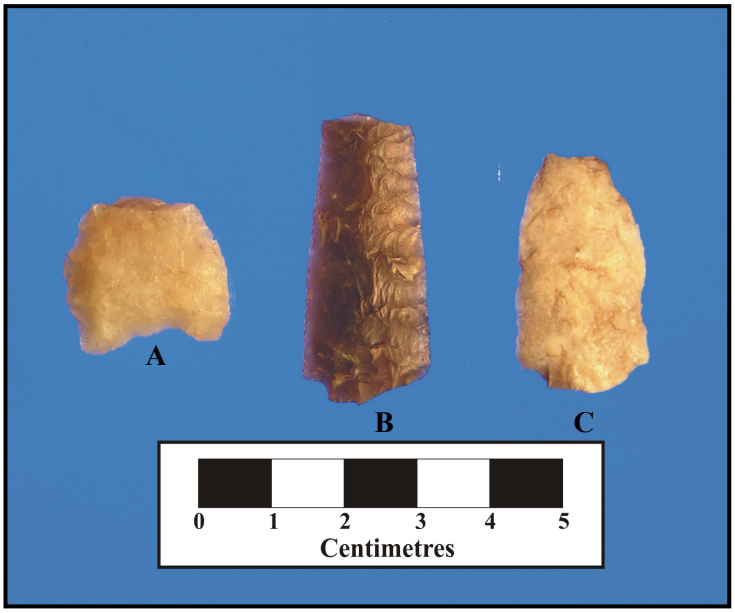

Figure 10.2 Levels C4, C4A, and C4B Projectile Points.
(A = Cat. #1277; B = Cat. # 4798; C = Cat. #5331)

10.3.2 Unformed Tools

A miscellaneous cobble tool was found in the northeast quadrant of unit 20S 8E in Level C4B (Catalogue #4978). One end has a series of two or more flakes removed creating a chopper-like edge which may have resulted from hammering. The material is dark grey sandstone with mica mineral flecks. The large flat bottom is particularly smooth and stained black with some minor exfoliation in one spot. The other surfaces are bleached to a lighter grey. This may be natural as a result of the cobble being exposed for a long period of time with the darker flat base subjected to chemical

weathering from organic soil and the top subjected to bleaching from the sun. The cobble has a mass of 922.7 g and was found *in situ* 91 cm below surface.

A large quartzite pebble with a mass of 145.8 g has two well-defined impact areas. The stone was heavily used as a small percussion instrument. The tool was found in the northeast quadrant of unit 22S 11E in Level C4B (Catalogue #6079).

10.3.3 Flaked Stone Tools

Aside from projectile points, fourteen flaked tools were retrieved from the combined fourth levels. Ten tools were from C4 where C4A and C4B are compressed, one tool was from C4A, and three tools were from C4B only.

Three quartzite biface fragments were found in Level C4A. Two of the biface fragments, both from unit 22S 8E, are from the same parent material and are likely portions of the same tool (Catalogue #2299 and #2311). The third biface has a knife-like edge with a tip similar to a drill (Catalogue #1908). Although the base and side have broken, a partial notch suggests that it was hafted. A white chert retouched flake was recovered from the same area (Catalogue #2303). A silicified wood sidescraper with retouch along one lateral edge was found in unit 18S 4E (Catalogue #3537). Four utilized flakes from Level C4 are composed of chalcedony, silicified peat, quartzite, and the fourth is a large sandstone spall (Catalogue #1496, #3108, #3532, #2898). A coarse Rocky Mountain Quartzite spall has been unifacially flaked along one edge creating a somewhat serrated edge (Catalogue #1276).

The single tool from C4A is a grey chert endscraper preform found in unit 18S 5E with cortex on the dorsal side and preliminary thinning and shaping (Catalogue #3795). Figure 10.3 illustrates a number of tools from Levels C4 and C4A.

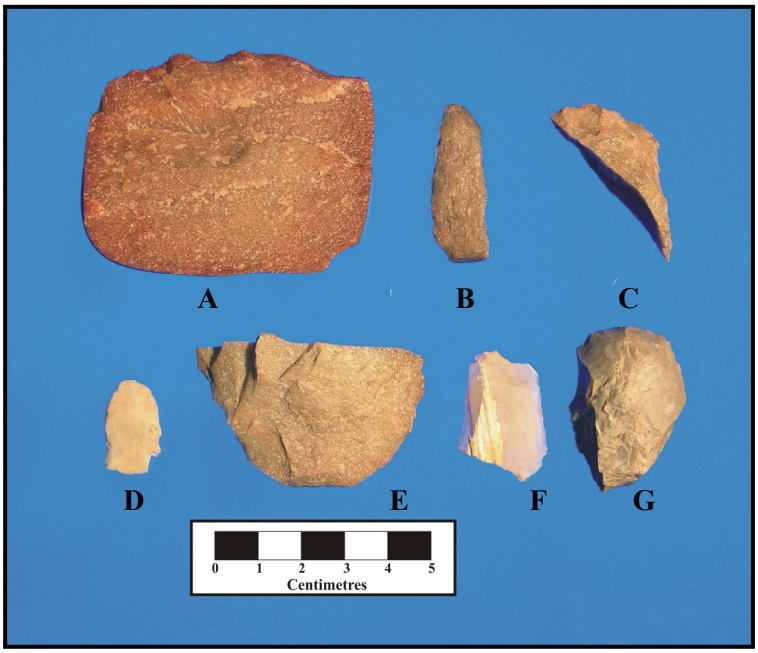

Figure 10.3 Level C4 and Level C4A Tools. (A = Cat. #1276; B = Cat. # 1908; C = Cat. #2299; D = Cat. #2303; E = Cat. #2311; F = Cat. #3537; G = Cat. #3795, Level C4A)

Level C4B tools consist of three marginally retouched flakes made from grey chert, Swan River chert, and heat-treated chert were found in units 21S 8E, 20S 8E, and 20S 9E, respectively (Figure 10.4; Catalogue #2068, #4988, and #5166).

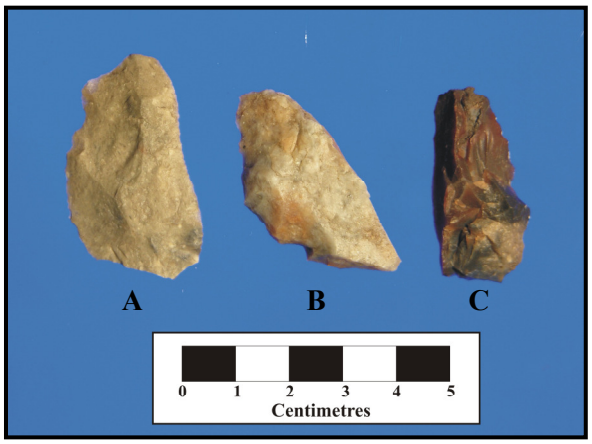

Figure 10.4 Level C4B Tools. (A = Cat. #2068; B = Cat. #4988; C = Cat. #5166)

10.3.4 Core and Core Fragments

Within the western portion of the excavation block, where Level C4A and C4B are not separated, two heat-treated Swan River chert core fragments were found to refit

(Catalogue #1755; #1959). They represent an expended discoidal core with multiple flake scars. Within the separated layers, two cores were recovered from Level C4A; three cores and a core fragment from Level C4B (Table 10.1).

There were two cores recovered from Level C4A. The first is a multidirectional heat-treated Swan River chert core fragment shows evidence of platform cortex (Catalogue #5553). The second, a large, partially heat-treated Rocky Mountain Quartzite core has flakes removed regularly from opposite ends of the cobble (Catalogue #3935). Cortex with chatter marks remains on both ends and about a third of the surface of the cobble.

Three cores and a core fragment were recovered from Level C4B. A small expended Swan River chert core from unit 21S 9E may have been intended as an early-stage tool (Catalogue #5393). Multiple flakes were removed from both sides, leaving a small portion including a vug-filled cortex. A small Athabasca quartzite tested cobble was recovered (Catalogue #5139). Only two overlapping flakes were removed with unfortunate step fractures. Chatter marks on the cortex suggest that it was not a favourable cobble for flint-knapping. A similar Athabasca quartzite primary flake was found in the same quadrant. Also in Level C4B, a large Athabasca quartzite core with more than seven negative flake scars removed bi-directionally from one face was found in unit 21S 10E (Catalogue #5576). With a mass of 1644.4 g, it is the largest core in this level. A small heat-treated Swan River chert core fragment completes the core assemblage (Catalogue #4829).

Table 10.1 Level C4 Core and Core Fragments.

Cat. #	Level	Unit	Mass (g)	Material	Type
#1755 #1759	C4	21S 7E	51.0	SRC (heat-treated)	Multidirectional; Discoidal
#5553	C4A	21S 10E	44.3	SRC (heat-treated)	Multidirectional Fragment
#3935	C4A	17S 6E	1217.1	Quartzite (heat-treated)	Multidirectional Platform
#4829	C4B	20S 7E	17.4	SRC (heat-treated)	Fragment
#5139	C4B	20S 9E	208.3	Athabasca Quartzite	Amorphous Tested Cobble
#5393	C4B	21S 9E	24.5	SRC	Indeterminate
#5576	C4B	21S 10E	1644.4	Athabasca Quartzite	Bi-directional

10.3.5 Debitage

A total of 1099 pieces of debitage was recovered from Level C4, C4A and C4B; almost three quarters of this amount is from Level C4B. Less than ten percent of the debitage was recovered from Level C4A of which most is from units 21S 8E and 22S 9E.

Level C4 contained 201 flakes and 23 pieces of shatter (Table 10.2). Quartzite and various cherts make up the majority of lithic material type, at 35.3% and 33.5%, respectively. Swan River chert makes up 16.1% of the assemblage. The remaining 15% includes fewer than ten pieces of quartz (4%), chalcedony (2.2%), silicified siltstone (2.2%), and various other siliceous materials. Only 14% of the debitage is heat-treated. There are a higher percentage of primary flakes in Level C4 than other cultural levels at the site (15.2%). Tertiary flakes constitute 50.4% of the debitage and secondary flakes 24.1%. Pieces of shatter make up remaining 10.3% of the debitage.

Table 10.2 Level C4 Flaked Lithic Debitage.

Material Type	Primary	Secondary	Tertiary	Shatter	Total	%
SRC	9 (H/T: n=3)	9 (H/T: n=3)	15 (H/T: n=9)	3	36 (H/T: n=15)	16.1
Chert (white, grey, tan, yellow, black, red)	8 (H/T: n=2)	5 (H/T: n=1)	54 (H/T: n=11)	8	75 (H/T: n=14)	33.5
Chalcedony	-	2	2	1	5	2.2
Jasper	2 (H/T: n=1)	-	2	-	4 (H/T: n=1)	.1.8
KRF	-	-	1	-	1	.4
Quartz	1	6	1	1	9	4.0
Quartzite	11	27	35	6	79	35.3
Siltstone	-	-	1	-	1	.4
Silicified Peat/Sard	1	1 (H/T: n=1)	-	2	4 (H/T: n=1)	1.8
Silicified siltstone	2	3	-	-	5	2.2
Silicified Wood	-	-	1	2	3	1.3
Indet. Sedimentary	-	1	1	-	2	.9
Total	**34**	**54**	**113**	**23**	**224**	**100%**
% Total	**15.2**	**24.1**	**50.4**	**10.3**	**100%**	
H/T = Heat-treated; Total Amount of Heat-treated Debitage = 31						

A total of 64 flakes and 14 pieces of shatter was recovered from Level C4A (Table 10.3). The most common material type is Swan River chert at 39.7%, chert is a close second at 35.9%, and quartzite is third at 16.7%. The remaining 7.8% is comprised of

chalcedony, quartz, Knife River flint, and silicified peat all of which were found in one to three examples. Heat-treatment accounts for only 11% of the debitage. Two thirds of the debitage are tertiary flakes (64.1%). Secondary flakes account for 21.8% and primary flakes are only 5.1%. The remaining 17.9% of the debitage is shatter.

Table 10.3 Level C4A Flaked Lithic Debitage.

Material Type	Primary	Secondary	Tertiary	Shatter	Total	%
SRC	1 (H/T: n=1)	5 (H/T: n=2)	20	5	31 (H/T: n=3)	39.7
Chert (white, pink, grey)	-	3	23 (H/T: n=5)	2	28 (H/T: n=5)	35.9
Chalcedony	-	-	2	-	2	2.6
KRF	-	-	1	-	1	1.3
Quartz	-	1	-	1	2	2.6
Quartzite	3 (H/T: n=1)	1	3	6	13 (H/T: n=1)	16.7
Silicified Peat/Sard	-	-	1	-	1	1.3
Total	**4**	**10**	**50**	**14**	**78**	**100%**
% Total	**5.1**	**21.8**	**64.1**	**17.9**	**100%**	
H/T = Heat-treated; Total Amount of Heat-treated Debitage = 9						

Table 10.4 Level C4B Flaked Lithic Debitage.

Material Type	Primary	Secondary	Tertiary	Shatter	Total	%
SRC	11 (H/T: n=8)	43 (H/T: n=19)	102 (H/T: n=31)	53 (H/T: n=19)	209 (H/T: n=59)	26.2
Chert (white, pink, grey)	3 (H/T: n=2)	19	297 (H/T: n=44)	19	338	42.4
Basalt	-	-	1	-	1	.1
Chalcedony	-	4 (H/T: n=1)	76 (H/T: n=3)	-	80	10.0
Jasper	2	2	1	4	9	1.1
KRF	-	-	3	-	3	.4
Quartzite	14	59	58	20	151	18.9
Siltstone	-	1	1	-	2	.3
Silicified Peat/Sard	-	1	1 (H/T: n=1)	1	3	.4
Silicified siltstone	-	-	1 (H/T: n=1)	-	1	.1
Indeterminate Sed. (Greywacke)	-	1	-	-	1	.1
Total	**30**	**130**	**541**	**97**	**798**	**100%**
% Total	**3.7**	**16.3**	**67.8**	**12.2**	**100%**	
H/T = Heat-treated; Total Amount of Heat-treated Debitage = 130						

Level C4B has a large amount of lithic debitage with 700 flakes and 97 pieces of shatter (Table 10.4). Debitage accounts for over 70% of the total artifact assemblage, a higher percentage than any other level. The greatest concentration is within the northwest quadrant of 21S 9E and the surrounding units of Level C4B. The most common material type is chert at 42.4%. Swan River chert is the second most common material at 26.2% followed by quartzite at 18.8% and chalcedony at 10%. Jasper, siltstone, and four other materials make up the remaining 2.5%. The majority of debitage are small tertiary flakes making up over two thirds of the total debitage (67.9%). Primary flakes comprise only 3.6% while secondary flakes and shatter make up 16.3% and 12.2%, respectively. The debitage indicates a great deal of tool use and refinishing.

10.3.6 Fire-Cracked Rock

There is a total of 618 pieces of FCR with a mass of 13 kg within Levels C4, C4A, and C4B combined (Table 10.5). More specifically, there are 488 FCR with a mass of 8.2 kg in C4 only, 33 FCR with a mass of 2 kg in C4A only, and 89 FCR with a mass of 2.8 kg in C4B only. The majority of FCR is mostly crumbled pebbles or small to medium sized cobbles with an average (mean) size of 21 g. Level C4B contains more pieces of FCR, with a greater variety of material types although the pieces are small. Granite comprises almost 90% of the total number of FCR, or 60% by mass. There is significantly more gneiss in C4A than other materials, a marked contrast to C4B and the combined C4A and C4B levels.

Table 10.5 Level C4, C4A, and C4B FCR.

	C4 Compressed				C4A Only				C4B Only			
Material	**#**	**%**	**Mass (g)**	**%**	**#**	**%**	**Mass (g)**	**%**	**#**	**%**	**Mass (g)**	**%**
Granite	442	88.6	5,404.8	89.2	29	87.9	416.7	21.2	70	79.8	2,241.2	79.0
Basalt	3	.5	2.9	< .1	0	0	0	0	3	3.4	2.9	.1
Gabbro	5	.8	17.0	.2	0	0	0	0	5	5.6	3.7	.1
Gneiss	12	2.3	1,936.8	23.6	1	3.0	1,441.7	73.5	1	1.1	38.3	1.4
Quartzite	22	4.2	106.0	1.3	0	0	.0	0	2	2.2	1.6	< .1
Sandstone	6	1.8	6.8	.1	2	6.1	95.3	4.9	3	3.4	337.6	11.9
Schist	2	.8	3.8	< .1	1	3.0	9.0	.4	2	2.2	27.7	1.0
Siltstone	1	.2	727.9	8.9	-	-	-	-	-	-	-	-
Indet.	2	.8	1.4	< .1	-	-	-	-	2	2.2	183.4	6.5
Total	**495**	**100%**	**8,207.4**	**100%**	**33**	**100%**	**1,962.70**	**100%**	**90**	**100%**	**2,836.4**	**100%**

10.4 Cultural Level 4 (A and B) Faunal Assemblage

The faunal assemblage of the combined Level C4 (including C4A and C4B) is comprised of a majority of unidentifiable bone fragments spread throughout the level. The preservation was very poor, and the bone fragmented upon excavation. The total number of specimens is 3,120, with a mass of 1100.9 g. At least two bison individuals were identified from the entire fourth level. There are fewer faunal remains in the lower, eastern level, where C4A is separated from C4B in the eastern units. The number of taxa represented is very low as all specimens may be attributed to bison (*Bison bison*), aside from a single small bird bone recovered from unit 22S 4E. All other bones are attributed to a more general taxonomic classification (Table 10.6).

Table 10.6 Levels C4, C4A, C4B Faunal Taxa.

	C4		C4A		C4B		C4 Total
Taxon	**NISP**	**Mass (g)**	**NISP**	**Mass (g)**	**NISP**	**Mass (g)**	**MNI**
Bison bison	771	592.4	-	-	465	186.1	2
order Artiodactyla	496	66.1	292	29.1	105	8.6	-
class Mammalia	390	65.4	480	99.6	87	51.8	-
class Aves	1	.2	-	-	-	-	1
Unidentified	23	1.2	9	.3	1	.1	-
Total	**1,681**	**725.3**	**781**.	**129.0**	**658**	**246.6**	**3**

10.4.1 Level C4 Taxon and Element Identification

The NISP is 1,681 in the western portion of the excavation, where the levels are compressed into a single Level C4. Bison specimens account for 45.9% of the assemblage by count. Bison remains include maxillary and mandibular teeth, metacarpal fragments, right tibia shaft and right talus. At least two bison are present in this level because of the occurrence of both adult and juvenile mandibular molars. Large ungulate long bone shaft fragments were collected, likely bison. A small bird rib, likely non-cultural, brings the minimum number of species to two. Burned and calcined specimens account for 1.1% and 2.1% of the assemblage, respectively.

10.4.2 Level C4A Taxon and Element Identification

Within Level C4A the faunal remains are comprised of small, unidentifiable fragments. The NISP is 781. Of this, 37.4% can be attributed to artiodactyls and 61.5%

are generally classified as mammal. The remaining fragments are too small to be identified. Burned bone and enamel amount to 13.7% while calcined bone and enamel is 9.3% of the assemblage by count. One calcined bone specimen is distinctively foetal, likely bison.

10.4.3 Level C4B Taxon and Element Identification

A sufficient quantity of bison limb bones was recovered from Level C4B for a radiocarbon date to be attempted; the result was 2340 ± 70 cal B.P. (BGS 2743). A bison tibia shaft from unit 19S 6E was combined with shaft fragments from units 18S 5E and 6E to obtain the date. These were the only specimens in this level that could be identifiable to species (70.7%). The remaining bone and enamel fragments were attributed to ungulate (16.0%), mammals (13.2%), or unidentified (.2%) taxa. Burned specimens amount to merely 3.5% of Level C4B while calcined specimens amount to 6.1%, by count.

10.4.4 Taphonomy

Aside from burned and calcined bone and highly fragment specimens, no other taphonomic attributes were noted (Table 10.7). No culturally modified marks were observed.

Table 10.7 Level C4, C4A, C4B Taphonomy.

Level	Faunal Type	Unburned		Burned		Calcined	
		NISP	Mass (g)	NISP	Mass (g)	NISP	Mass (g)
C4	Bone	1,324	501.1	14	1.9	34	6.9
	Enamel	303	215.1	4	.3	2	.1
	All	1,627	716.2	18	2.2	36	7.0
C4A	Bone	378	91.3	66	2.6	41	5.8
	Enamel	223	26.3	41	2.3	32	.7
	All	601	117.6	107	4.9	73	6.5
							.
C4B	Bone	509	232.7	-	-	40	4.9
	Enamel	86	7.4	23	1.5	-.	-
	All	595	240.1	23	1.5	40	4.9

10.5 Cultural Level 4 (A and B) Features

There were six features found in all of Level C4, C4A, and C4B, and three of these are considered possible hearths. One hearth feature is located in C4A, the second is from C4B, and the third is indeterminately in either Level C4A or C4B. There is an associated activity area with the C4B hearth. The remaining features are soil stains.

Feature 4-1 is a dark oval hearth-like stain in the northeast corner of unit 21S 5E, extending slightly into the adjacent units. Because of the condensed nature of the levels, it is impossible to distinguish the specific occupation level from which it originated. The feature measures approximately 25 cm by 30 cm in diameter and is 71 cm below surface at the deepest extent. FCR is present in the quadrant, as are multiple flakes. The McKean point was found within 25 cm of the feature in the same quadrant. A crude chopper and a few pieces of debitage were found in close proximity. Only a small amount of charcoal and calcined bone was recovered from the surrounding quadrants.

Feature 4-2 and Feature 4-3 are dark stains consistent with rodent disturbance. Feature 4-3 is clearly in C4A whereas Feature 4-2 is within the compressed portion of the block. Soil discolouration is dark and mottled

Feature 4-4 is a circular, basin-shaped hearth distributed partway between units 21S 8E and 22S 8E (Figure 10.5). Five large FCR cobbles and small burned rock fragments were found within the hearth. Unburned, burned and calcined bone were retrieved from the hearth fill and surrounding area. Less than two grams of charcoal were collected from the immediate units. Levels C4A and C4B separate to the north and east of the feature, and so it was possible to determine while excavating that the hearth is associated with Level C4A as it began in C4A and bottomed out in C4B.

Feature 4-5 is a hearth located in the northeast corner of unit 20S 9E in C4B. A number of FCR fragments and cobble are located within the hearth. Only a small amount of charcoal, calcined and burned bone was collected from the unit. Recovered within close proximity of the hearth were the Duncan projectile point, a point tip, a hammerstone, and three retouched flakes.

Feature 4-6 is a flaking station in the northwest quadrant of 21S 9E in C4B. Located within a metre southwest of Feature 4-5, it is likely associated with the hearth. The number of flakes in unit 21S 9E is significantly higher than the surrounding units. The

material types are varied representing the production of multiple tools. Presumably the finished tools were taken away with the flintknapper to be used and discarded elsewhere.

Figure 10.5 Feature 4-4 Hearth in Units 21S 8E and 22S 8E.

10.6 Interpretation of Cultural Level 4 (C4A and C4B)

Cultural Level 4 represents multiple occupation events separated partially by sandy hillslope sediment. The majority of activities are carried out in the eastern half of the excavation determined by a higher density of discarded tools, lithic debitage, and faunal debris. This higher density correlates with a more gently sloping living floor. Figures 10.6 and 10.7 illustrate the location of features in relation to plotted archaeological remains.

Level C4A represents a brief occupation as there are significantly fewer artifacts and activity areas than Level C4B. Level C4B is a more substantial assemblage, with twice as many faunal remains and ten times the debitage debris than Level C4A. In both levels, the majority of lithic debitage are secondary and tertiary flakes. A small percentage are primary flakes and as there are several cores present as well, this would suggest that there is both the production of new tools, as well as the resharpening of old tools during the processing of faunal remains. The majority of lithic types are local although some of

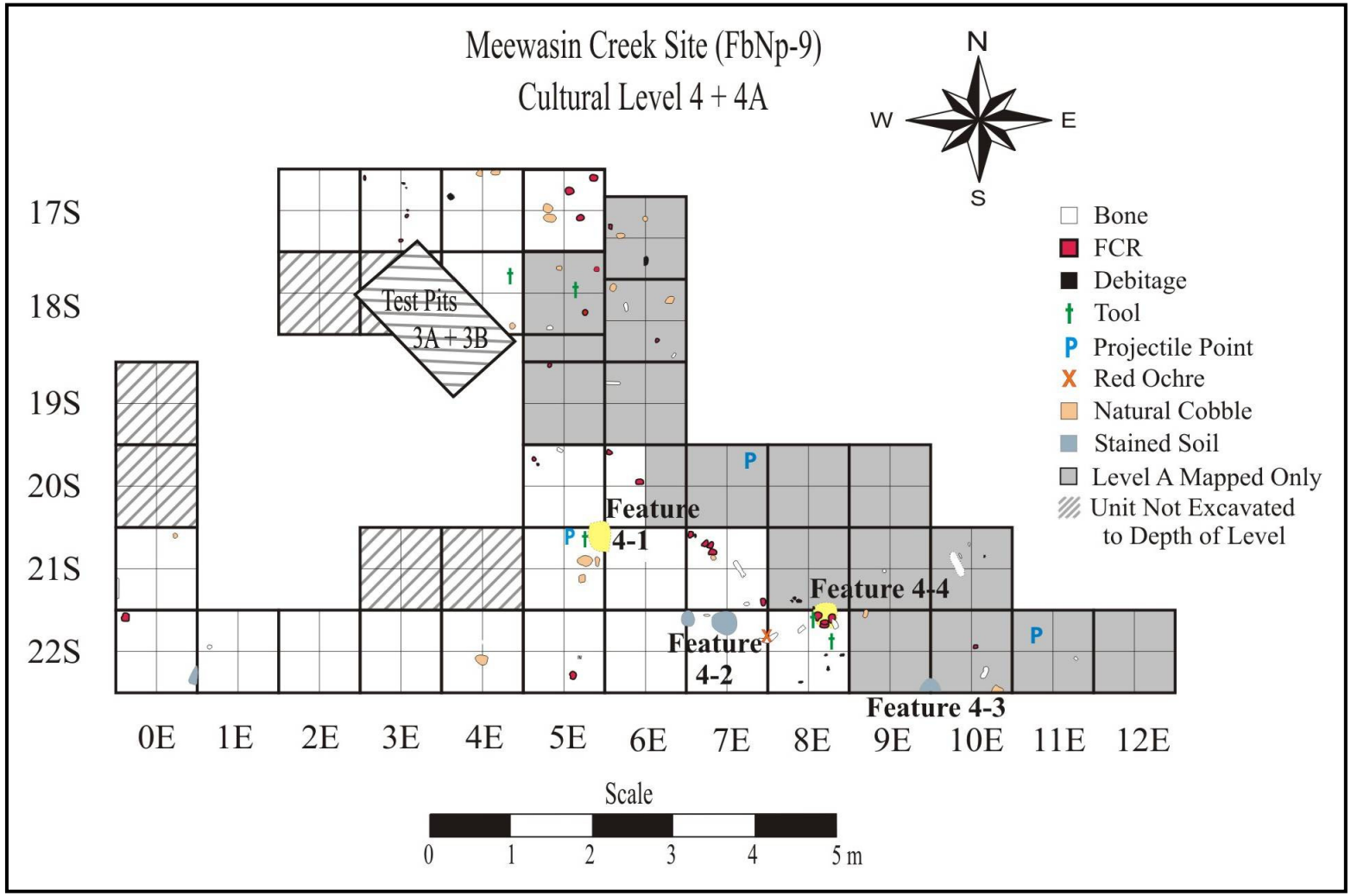

Figure 10.6 Distribution of Artifacts, Ecofacts and Features in Level C4 and C4A.

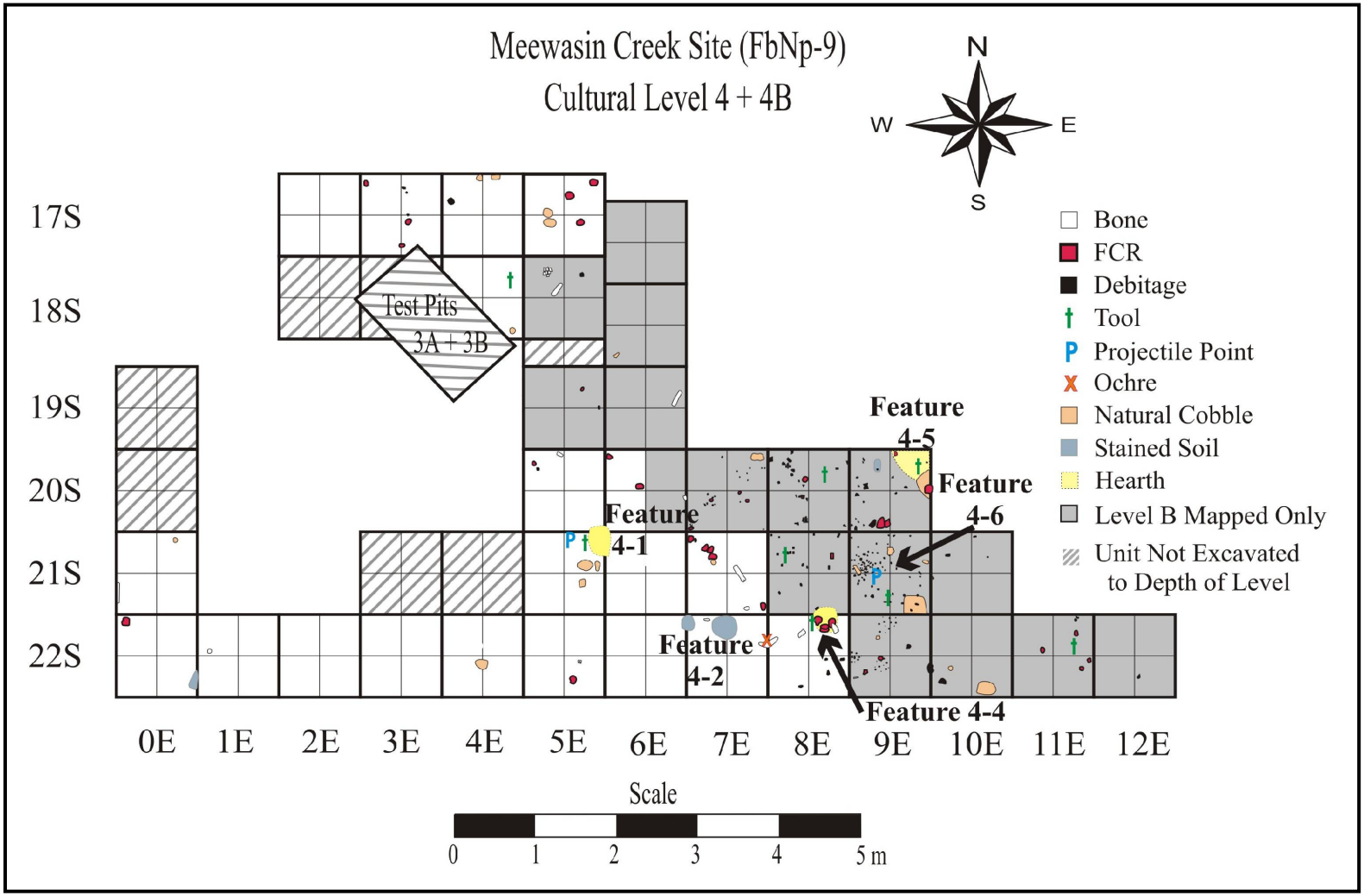

Figure 10.7 Distribution of Artifacts, Ecofacts and Features in Level C4 and C4B.

the lithic materials originate great distances from the site. The presence of Knife River flint, jasper and fine cherts indicates a preference for fine quality materials. Heat altering was employed in only a small percentage of debitage.

These levels combined contain the highest number of stone tools than any other. The majority are expedient edge-modified tools, but scrapers and well-formed tools are present in smaller numbers. The tools types indicate middle to later stage bison processing. The faunal remains are quite fragmentary and significantly more scarce which may be accounted for by greater exposure to the elements, the greater age of remains, and a higher level of processing.

The presence of the small calcined foetal bone may give a clue to seasonality if it is in fact bison. Bison generally rut in the mid-summer and the cows give birth in the spring after a nine month gestation period (Olsen 2005). Despite individual variation, the foetal bone may represent a winter kill between December and April. No other clues are evident to aid in seasonality.

Cultural affiliation can be determined by the projectile points and radiocarbon dates. The most recent visitors to the site in this level can be attributed to the Pelican Lake complex. Pelican Lake points in Saskatchewan date from 3300 to 1850 B.P. (Dyck 1983). The radiocarbon analysis in Level C4B obtained a calibrated date of 2340 ± 70 B.P. (BGS 2743). This episode is clearly within the time frame of a Pelican Lake occupation. The oldest events can be deduced by the irregular McKean point from Level C4. The McKean complex dates to 4150 to 3100 B.P. (Dyck 1983). Consequently, the condensed area represents a palimpsest of McKean and Pelican Lake occupations.

Chapter 11
Cultural Level 5

11.1 Introduction to Cultural Level 5 (C5A and C5B)

Occupation Level 5 corresponds with a deeply buried sandy loam layer rich in organic material. The level is separated above and below by relatively sterile loamy sand. Only 29.5 units were excavated deep enough to reach this level. The level is approximately 5 cm thick in the west at a depth of 69 to 75 cm below surface in the southwest corner of unit 22S 0E. Similar to Levels C4A and C4B the level separates into two occupations, Level C5A and Level C5B in the eastern portion of the excavation, separated by a fine layer of sediment (Figure 5.2; Figure 11.1). The buried soil slopes moderately downward through the eastern units, generally steeper than the contour of the surface. In unit 22S 12E, Level C5A is approximately 127 to 137 cm below surface, and Level C5B is 148 to 167 cm below surface in the southeast corner.

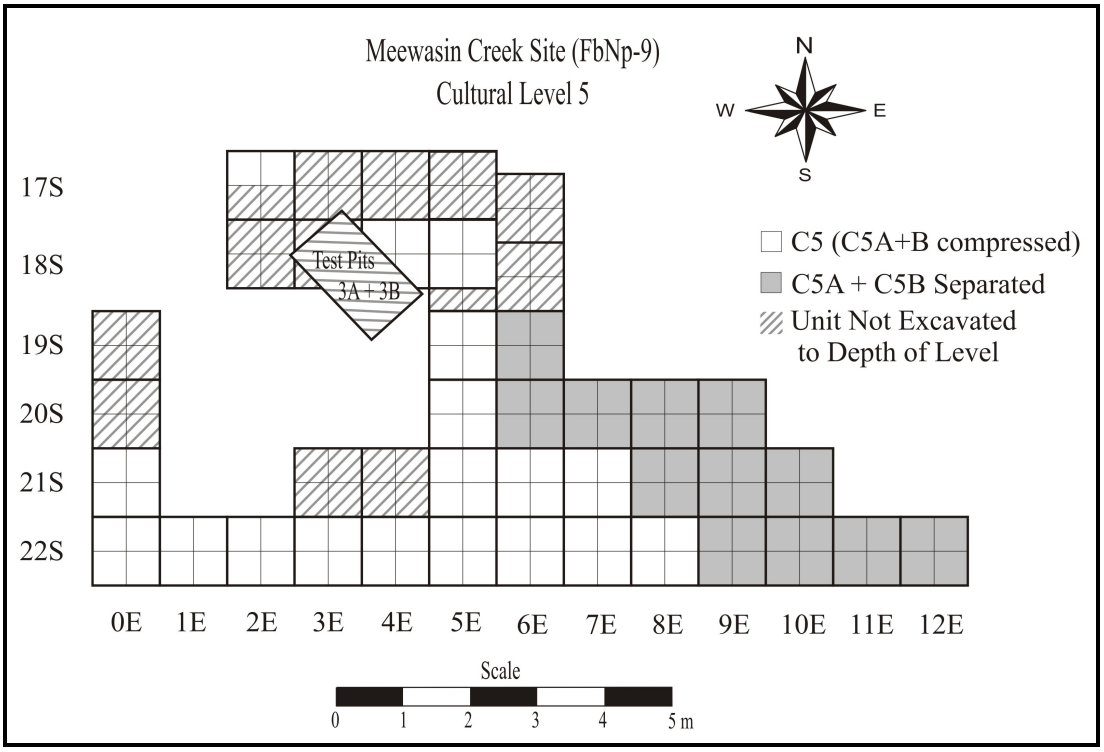

Figure 11.1 Cultural Level 5 (C5A + C5B).

A charcoal sample from Level C5A produced a radiocarbon age of 3750 ± 120 B.P.; 4120 cal B.P. (BSG 2741). No diagnostic artifacts were found within this level. Level C5B is classified as a Duncan occupation based on a projectile point found. A total of 783 specimens was recovered from Level C5 with a mass of 22,398 g. More specifically, 73 specimens are from Level C5A; 379 from Level C5B; and the remainder from the compressed levels. Following the format of the previous chapter, Levels C5, C5A and C5B will be discussed in turn within each of the following categories.

11.2 Layer between C4 and C5

A number of artifacts must be mentioned at this time as they were found in the eastern half of the excavation block, within the sandy layer below C4B and above C5.

Five stone tools were recovered: one unformed tool and three flaked tools. A sandstone hammerstone fragment was found in unit 22S 8E, 107 cm below surface with battering impacts at one end (Catalogue #2336). A cathead chert biface fragment with thinning on one end was recovered from unit 18S 5E (Catalogue #3820). A silicified wood uniface with retouch on both sides (Catalogue #6086) and a chert utilized flake fragment (Catalogue #6267) make up the remaining tools.

Thirty-seven pieces of debitage were recovered in the sterile layer. Over half of the total debitage were tertiary flakes (n = 19), which are easily shifted in a sandy matrix. Twelve secondary flakes were found. Primary flakes and shatter total three pieces each. Chert makes up the most common lithic type (n = 15), followed by Swan River chert (n = 10). Quartzite was represented by the three primary flakes. Chalcedony and quartz were each represented by two specimens, and Knife River flint, Gronlid Siltstone, jasper, porcellanite, and siltstone were each represented by one specimen.

Sixteen small granite FCR fragments with a total mass of 12.5 g were recovered from units 18S 5E, 20 9E, and 22S 9E. Not surprisingly, similar FCR was from the C4B from the same units.

A total of 15 faunal specimens with a mass of 1.6 g was recovered from the interlayer. Of these, twelve specimens are unburned, one is burned, and three are calcined. No other identifying landmarks or taphonomic features were observed. Less than a gram of charcoal was recovered from unit 20S 8E.

Almost all the specimens collected in this level correspond to both artifacts from both C4 and C5, and in fact, the majority of the cultural assemblage. Gronlid Siltstone and porcellanite were only found in C5 and may have shifted upward over time or may relate to definition of levels defined during the excavation processes.

11.3 Cultural Level 5 (A and B) Lithic Assemblage

11.3.1 Projectile Points

The two projectile points found in these levels consist of one complete point and a point tip, both recovered from unit 20S 9E of Level C5B. The Swan River chert point tip has no culturally diagnostic features (Catalogue #5183). The complete point, also made of Swan River chert, can be attributed to the Duncan complex (Figure 11.2; Catalogue #5183). The point is slightly asymmetrical, comprised of moderately poor material and flaking pattern, which is characteristic of other Duncan points found in Saskatchewan (Dyck 1983). The two points were found within 85 cm of each other: the tip from the northeast quadrant, and the Duncan point 11 cm deeper in the southwest quadrant.

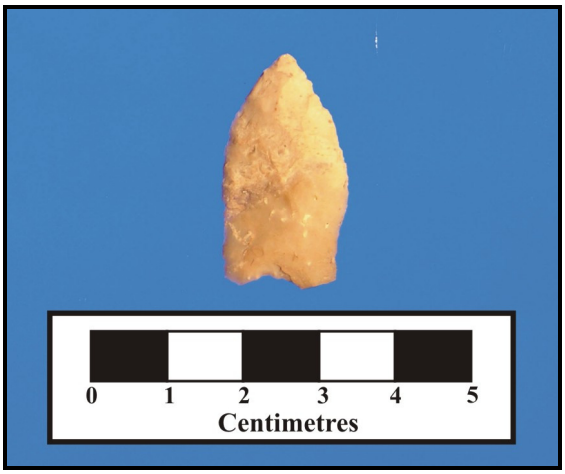

Figure 11.2 Level C5B Duncan Projectile Point.

11.3.2 Unformed Tools

One hammerstone was found in Level C5B in unit 22S 10E (Catalogue #5919). This small, sub-rounded granite cobble has a small impact area at one apex. The tool has a mass of 149 g. No other unformed tools were found in these levels.

11.3.3 Flaked Stone Tools

In Cultural Level 5 where the level is compressed, four flaked stone tools were recovered. A black chert endscraper produced by bipolar percussion was recovered from unit 22S 0E (Figure 11.3; Catalogue #532). An agate end/sidescraper was recovered from unit 22S 7E (Figure 11.3; Catalogue #1913). A Swan River chert bifacially retouched flake (Catalogue #1287) and a large Swan River chert utilized flake (Catalogue #1166) were also recovered. Additionally, a jasper end/sidescraper was found between Level C5A and 5B in unit 22S 10E (Figure 11.3; Catalogue #5909). All three of the scrapers were well utilized.

In Level C5A, three flaked tools were found. An expended chert endscraper was recovered from unit 21S 8E (Figure 11.4; Catalogue #2151). A grey chert multi-use tool with three or more edges that could be used as a sidescraper and graver was recovered from unit 22S 12E (Figure 11.4; Catalogue #6271). Finally, a banded chert utilized flake with unifacial retouch along one working edge was from unit 20S 8E (Catalogue #5007).

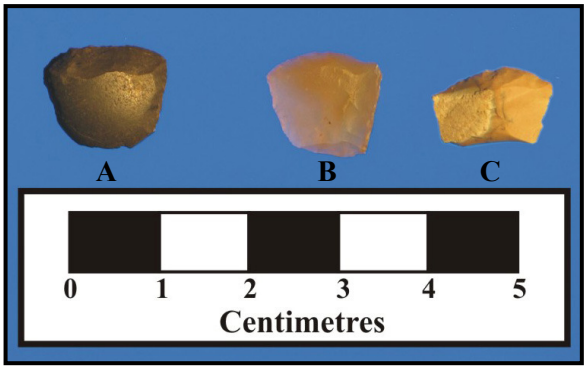

Figure 11.3 Level C5 Endscrapers.
(A = Cat. #532; B = Cat. #1913; C = #5909)

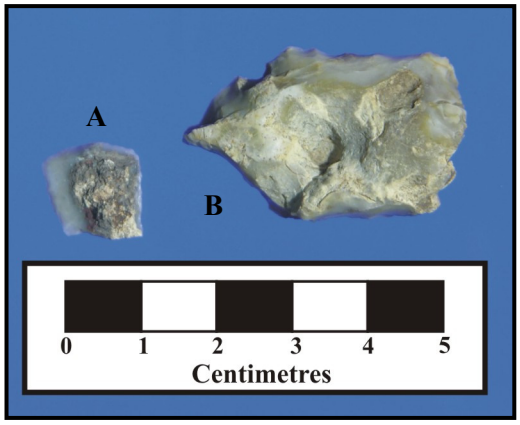

Figure 11.4 Level C5A Tools.
(A = Catalogue #2151; B = Cat. #6271)

Six flaked tools were recovered from Cultural Level 5B. The finest is a large heat-treated Swan River chert hafted biface recovered from unit 22S 11E (Figure 11.5; Catalogue #6106). Only the base and one shoulder remain from the robust, side-notched tool. Large side-notched hafted bifaces are commonly found in McKean occupations and referred to as "Oxbow knives" (Ramsay 1993:360). At the Graham site near Saskatoon, a Duncan point was found in close association with a coarse hafted biface (Walker 1984:142-143; Figure 6). The radiocarbon age from the Graham site at 3245 ± 45 is

similar to the Meewasin Level C5B age. A large hafted biface was recovered from level 3B at the Dog Child site in Wanuskewin (Cyr 2006).

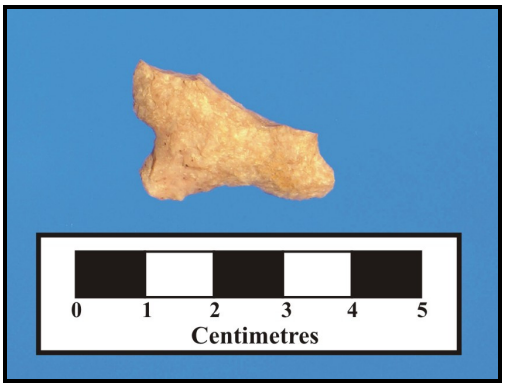

Figure 11.5 Level C5B Hafted Biface.

The proximal end of a coarse Swan River chert biface fragment was found in unit 22S 9E (Figure 11.6; Catalogue #5764). A creamy agate sidescraper has a finely retouched edge along one slightly convex side of the tool (Figure 11.6; Catalogue #5928). A quartz tool with a notched base and retouched end and side was found in unit 20S 9E (Figure 11.6; Catalogue #5199). From the same unit, a unifacially retouched grey chert flake with an almost serrated working edge was recovered (Figure 11.6; Catalogue #5181). A second unifacially retouched flake that is made of chalcedony with thick white cortex was from 22S 11E (Figure 11.6; Catalogue #6114).

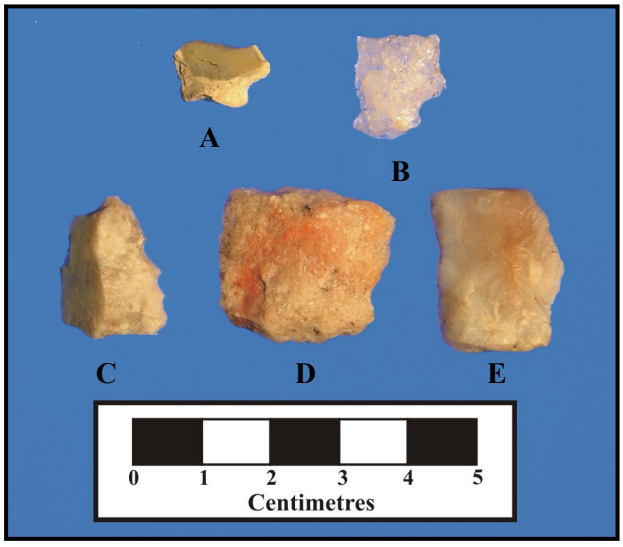

Figure 11.6 Level C5B Tools. (A = Cat. #6114; B = Cat. #5199; C = 5181; D = 5764; E = 5928)

11.3.4 Cores and Core Fragments

Five cores were found within the whole fifth cultural level (Table 11.1). In the south-western portion of the excavation block where the levels are condensed, a large angular Swan River chert core was found (Catalogue #613). Six small negative flake scars occur on opposite ridges along the long-axis of the cobble all of which resulted in step-fractures. A medium-sized rounded quartzite cobble has three flakes removed from one end (Catalogue #4498).

Table 11.1 Level C5 Core and Core Fragments.

Cat. #	Level	Unit	Mass (g)	Material	Description
#613	C5	22S 1E	170.1	SRC	Amorphous
#4498	C5	20S 5E	687.7	Quartzite	Tested Cobble
#2365	C5B	22S 8E	230.1	Indeterminate Siliceous Material	Amorphous
#5918	C5B	22S 10E	32.4	Feldspathic Siltstone (heat-treated)	Core Fragment
#5922	C5B	22S 10E	1,160.0	SRC (heat-treated)	Platform

Where Level C5 is subdivided, cores have only been found in Level C5B. These include an uncommon fossiliferous sedimentary cobble-core fragment with a thick porous cortex measuring up to 18 mm thick (Catalogue #2365). Large crystal lined cavities are present within the rock. The flaking pattern is irregular and difficult to determine. A small heat-treated feldspathic siltstone core fragment was found within unit 22S 10E near a few flakes of the same material (Catalogue #5918). A large heat-treated Swan River chert core was found in the same unit with at least three large flakes removed irregularly (Catalogue #5922).

11.3.5 Debitage

Analysis has revealed a total of 329 pieces of debitage recovered from Level C5, Level C5A, and Level C5B, with the majority from Level C5B. The lithic assemblage is predominately comprised of local materials with the most common material type being chert at 41% followed by Swan River chert at 35%.

Condensed Level C5 includes materials types found also in both Levels C5A and C5B (Table 11.2). Swan River chert is the most common lithic type at 39% followed closely by chert at 30%. The remaining material includes quartzite (13%) and

porcellanite (6%) and in smaller quantities, jasper, Knife River flint, quartz, and silicified siltstone were found in one or two examples. Secondary and tertiary flakes are the most common flake type (32.8% each), followed by shatter (22.4%) and primary flakes (12.0%).

Table 11.2 Level C5 Lithic Debitage.

Material Type	Primary	Secondary	Tertiary	Shatter	Total	%
SRC	2	11 (H/T: n=1)	7	6 (H/T: n=2)	26 (H/T: n=3)	38.8
Chert (white, grey, tan)	3	3 (H/T: n=2)	9	5	20 (H/T: n=2)	29.9
Chalcedony	-	-	2 (H/T: n=1)	-	2 (H/T: n=1)	3.0
Jasper	-	1	1	-	2	3.0
KRF	1	-	-	-	1	1.5
Porcellanite	-	1	1	2	4	6.0
Quartz	-	1	1	-	2	3.0
Quartzite	2	4	1	2 (H/T: n=1)	9 (H/T: n=1)	13.4
Silicified siltstone	-	1	-	-	1	1.5
Total	**8**	**22**	**22**	**15**	**67**	**100%**
% Total	**12.0**	**32.8**	**32.8**	**22.4**	**100%**	
H/T = Heat-treated; Total Amount of Heat-treated Debitage = 7						

Within Level C5A, 42 debitage fragments were recovered (Table 11.3). Chert is the most common material type (52.4%), followed by Swan River chert (24.8%). The remaining six materials listed in Table 11.3 were found in only one to three examples. Tertiary flakes occur most frequently (40.5%). Secondary flakes and shatter occur comparably at 28.5% and 26.2%, respectively. Primary decortication flakes were found in only two examples.

Lithic remains in Level C5B are comprised of 220 pieces of flakes and shatter (Table 11.4). Following the trend, chert and Swan River chert are the most common material types comprising 42.7% and 35.9% of the assemblage respectively. Quartzite is third most common at 7.7%. The remaining 13.7% includes Gronlid Siltstone, silicified siltstone, and quartz (2.3% each), as well as ten other materials listed in Table 11.4 that each comprise less than 2%. The majority of debitage are tertiary flakes (64.1%), followed by secondary flakes (18.2%), shatter (13.4%), and finally, primary flakes (4.1%). A total of 12.7% of the debitage assemblage exhibits evidence of heat-treatment.

Table 11.3 Level C5A Lithic Debitage.

Material Type	Primary	Secondary	Tertiary	Shatter	Total	%
SRC	2 (H/T: n=1)	2	5	1 (H/T: n=1)	10 (H/T: n=2)	24.8
Chert (browns, grey)	-	8	10	4	22	52.4
Chalcedony	-	1	-	-	1	2.4
KRF	-	-	-	1	1	2.4
Porcellanite	-	-	-	3	3	7.1
Quartz	-	-	2	-	2	4.8
Siltstone (Gronlid)	-	1	-	-	1	2.4
Silicified siltstone	-	-	-	2	2	4.8
Total	**2**	**12**	**17**	**11**	**42**	**100%**
% Total	**4.8**	**28.5**	**40.5**	**26.2**	**100%**	
H/T = Heat-treated; Total Amount of Heat-treated Debitage = 2						

Table 11.4 Level C5B Lithic Debitage.

Material Type	Primary	Secondary	Tertiary	Shatter	Total	%
SRC	1	16 (H/T: n=2)	57 (H/T: n=13)	5 (H/T: n=1)	79 (H/T: n=16)	35.9
Chert (browns, pink, white, grey, etc)	2	12 (H/T: n=2)	73 (H/T: n=1)	8 (H/T: n=1)	95 (H/T: n=4)	43.2
Cathead Chert	-	-	-	1	1	.5
Basalt	-	-	1	-	1	.5
Chalcedony	1	-	1	1	3	1.4
Jasper	-	-	1	-	1	.5
KRF	-	1	-	-	1	.5
Porcellanite	1	-	-	-	1	.5
Quartz	-	1	1	3	5	2.3
Quartzite	1 (H/T: n=1)	8 (H/T: n=2)	-	8 (H/T: n=2)	17 (H/T: n=5)	7.7
Siltstone	-	1	-	1	2	.9
Siltstone (Feldspathic)	-	-	2 (H/T: n=2)	-	2 (H/T: n=2)	.9
Siltstone (Gronlid)	2 (H/T: n=1)	-	1	2	5 (H/T: n=1)	2.3
Silicified Peat	1	-	-	-	1	.5
Silicified siltstone	-	-	4	1	5	2.3
Indeterminate Sedimentary	-	1	-	-	1	.5
Total	**9**	**40**	**141**	**30**	**220**	**100%**
% Total	**4.1**	**18.2**	**64.1**	**13.6**	**100%**	
H/T = Heat-treated; Total Amount of Heat-treated Debitage = 28						

11.3.6 Fire-Cracked Rock

There is a total of 190 FCR found scattered throughout all of Level C5 with a combined mass of 17.8 kg (Table 11.5). Overwhelmingly, the predominant material type is granite comprising 91.1% of the total count and 95.9% of the total mass. Small fragments of basalt, gabbro, gneiss, quartzite and schist are present to a lesser extent.

Table 11.5 Level C5 FCR

C5 FCR Including C5, C5A, and C5B					C5A Only				C5B Only			
Material	**#**	**%**	**Mass (g)**	**%**	**#**	**%**	**Mass (g)**	**%**	**#**	**%**	**Mass (g)**	**%**
Granite	173	91.1	17,060.7	95.9	15	88.2	3,436.5	88.8	124	90.5	9,412.6	98.7
Basalt	2	1.1	488.7	2.7	1	5.9	383.5	9.9	1	.7	105.2	1.1
Gabbro	1	.5	47.8	.3	1	5.9	47.8	1.2	-	-	-	-
Gneiss	2	1.1	8.7	<.1	-	-	-	-	2	1.5	8.7	.1
Quartzite	2	1.1	164.0	.9	-	-	-	-	-	-	-	-
Schist	10	5.3	11.9	.1	-	-	-	-	10	7.3	11.9	.1
Total	**190**	**100%**	**17,781.8**	**100%**	**17**	**100%**	**3,867.8**	**100%**	137	**100%**	**9,538.4**	**100%**

11.4 Cultural Level 5 (A and B) Faunal Assemblage

11.4.1 Levels C5, C5A and C5B Taxon and Element Identification

The total number of faunal remains from Levels C5, C5A, and C5B is 1649 specimens, with a mass of 454.6 g (Table 11.6). The majority of specimens are comminuted and highly friable. Not enough cancellous bone survived for radiocarbon dating. Because of the separation in the eastern third of the excavation block, it is more appropriate to look at Levels C5A and C5B separately from the combined stratum, Level C5.

Table 11.6 Level C5 Faunal Taxa.

	C5 Only		C5A		C5B		C5
Taxon	**NISP**	**Mass (g)**	**NISP**	**Mass (g)**	**NISP**	**Mass (g)**	**MNI**
Bison bison	77	118.8	-	-	111	138.8	1
order Artiodactyla	20	10.8	47	9.3	187	33.3	-
class Mammalia	846	112.7	-	-	241	29.2	-
Unidentified	94	.5	-	-	26	1.3	-
Total	**1,037**	**242.8**	**47**	**9.3**	**565**	**202.6**	**1**

In the western area where Level C5 is not divided, the total number of unburned bone fragments is 921 with a mass of 145.6 g. The only identifiable element is the left

calcaneus of a bison recovered from unit 22S 4E. A single piece of calcined bone was collected. Numerous tooth enamel fragments recovered are large ungulate, most likely bison. Of the 61 pieces of enamel totalling 87.6 g, three can be identified as maxillary molars; two of which are identified as the left M1 and M2 of a bison. Burned bone amounts to 22% of the assemblage by mass, or 52 fragments at 5.2 g. The MNI is one.

The faunal remains in Level C4A are comprised of only 47 enamel fragments with a mass of 9.3 g. These fragments represent an indeterminate species of ungulate or number of individuals.

The majority of faunal remains in Level C5B are small fragments scattered throughout the level, but unfortunately too small to identify. Bison fragments represent 19.6% of Level C5B which includes right maxillary teeth and left mandibular molars. The remaining specimens are identified only as artiodactyls (33.1%) and more generally to mammal (42.7%) or unidentified with respect to taxa (4.6%).

11.4.2 Taphonomy

Burned and calcined remains constitute 4.4% and 10.1% of the assemblage respectively (Figure 11.7). The presence of a hearth in unit 22S 9E corresponds with the occurrence of burned and calcined faunal fragments in this level. No other cultural modifications were noted.

Table 11.7 Level C5, 5A, 5B Taphonomy.

Level	Faunal Type	Unburned		Burned		Calcined	
		NISP	Mass (g)	NISP	Mass (g)	NISP	Mass (g)
C5	Bone	921	145.6	52	5.2	1	.6
	Enamel	63	91.4	-	-	-	-
	All	984	237.0	52	5.2	1	.6
C5A	C5A Total (All Enamel)	47	9.3				
C5B	Bone	181	23.7	20	1.2	52	4.8
	Enamel	302	171.6	5	1.1	5	.2
	All	483	195.3	25	2.3	57	5.0

Due to the poor condition and high fragmentation of the faunal elements, no more than an MNI of one encompasses the entire level, incorporating both levels C5A and

C5B, as well as the combined Level C5. Because of the limited remains, no further faunal analysis is warranted.

11.5 Cultural Level 5 (A and B) Features

Two features are noted in the fifth level: one in Level C5A and the second in Level C5B. Feature 5-1 is characterized by a distinct black stain noted in the northeast quadrant of unit 21S 8E in Level C5A. The dimensions are 27 cm by 25 cm. The stain does not resemble a hearth, but likely represents the deposition of organic matter. Very little charcoal was noted within the stain, but a large piece was collected immediately to the east and to the southwest. Tools noted nearby include a retouched flake and endscraper, both consistent with hide working activities. Also in Level C5A, a concentration of charcoal was noted throughout the southeast quadrant of 22S 11E, which may indicate the presence of a hearth further to the south of the excavation block.

Feature 5-2 is a possible hearth-like feature located in the southern portion of unit 22S 9E of Level 5B. The stain is approximately 45 cm in diameter and is buried 130 to 140 cm below surface. A number of calcined bone fragments, debitage, and FCR were collected in the vicinity. The feature was noted along the south wall while excavating, but it was not evident in the profile. A large cobble to the northwest may be associated with the feature as it is ideal for use as an anvil.

11.6 Interpretation of Cultural Level 5 (C5A and C5B)

The fifth cultural level represents multiple occupations partially separated by sterile sediment in the eastern units and compressed in the west. Figures 11.7 and 11.8 illustrate the location of features in relation to mapped artifacts.

The deeper level contains more faunal remains and a greater number of artifacts in general. The lithic assemblage indicates hide processing may be undertaken in both levels due to presence of several expended end/sidescrapers. The features present are consistent with hide processing; a task that requiring fires for smoking and tanning the hides. Debitage is comprised of a higher proportion of tertiary and secondary flakes which suggests there is more tool rejuvenation and tool modification than tool making from cores.

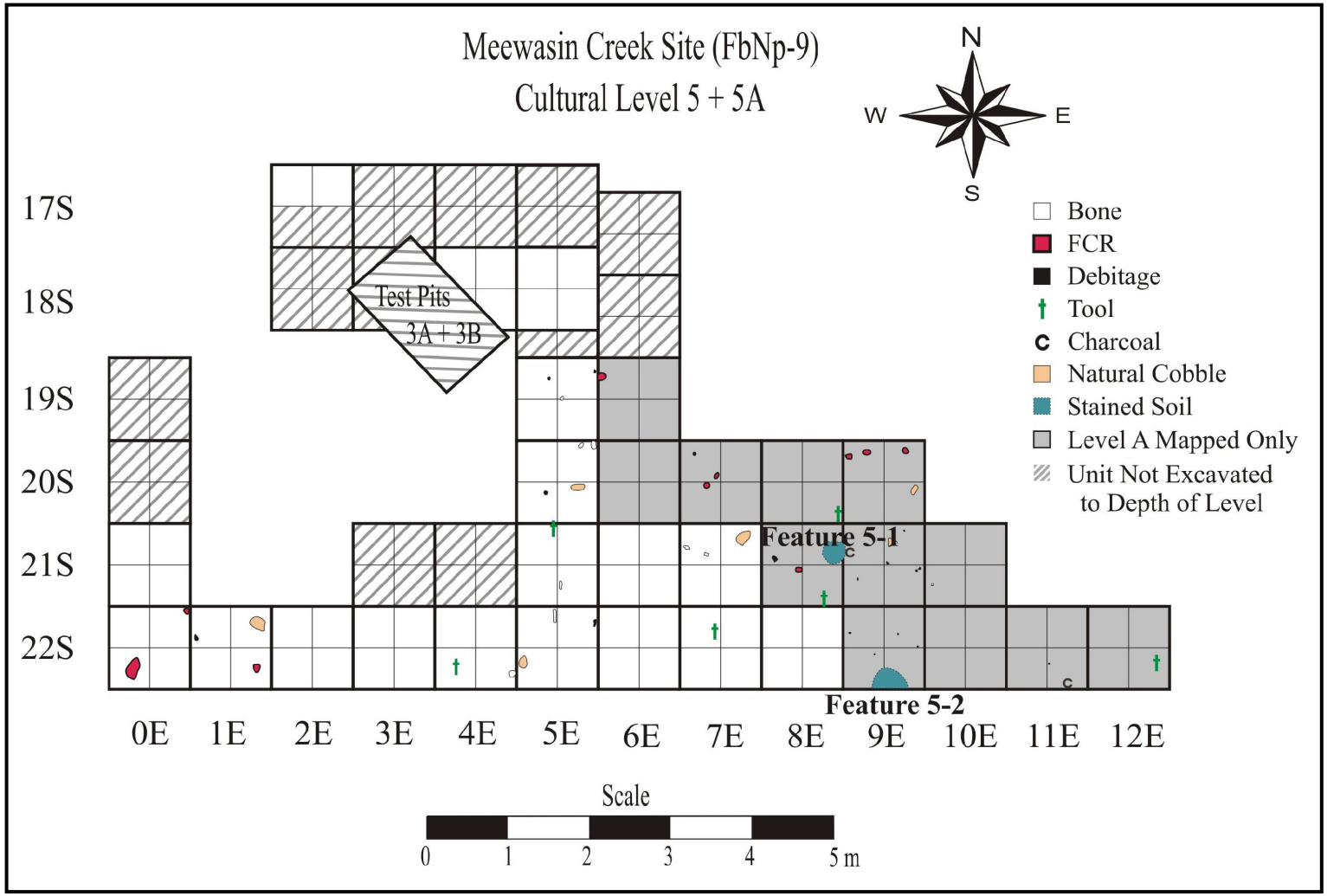

Figure 11.7 Distribution of Artifacts, Ecofacts and Features in Level C5 and C5A.

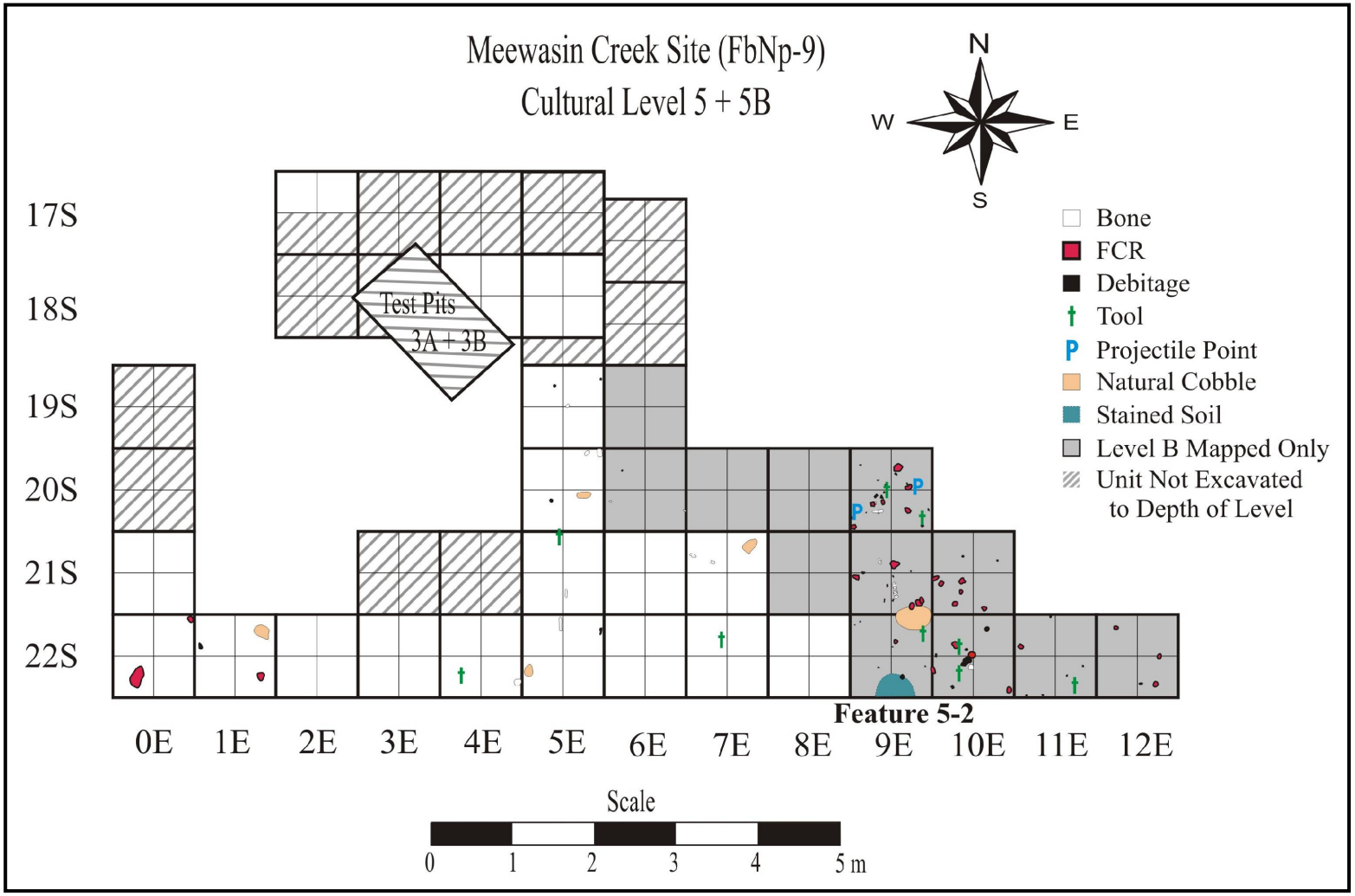

Figure 11.8 Distribution of Artifacts, Ecofacts and Features in Level C5 and C5B.

A charcoal samples from unit 22S 11E of Level C5A returned a radiocarbon age of 4120 ± 120 calibrated years B.P. (BSG 2741). The Duncan projectile point from Level C5B was found below the charcoal-bearing sediment and therefore must represent an older occupation. McKean complex occupations on the Northern Plains range from approximately 4150 to 3100 B.P. (Dyck 1983). Therefore, it is assumed that the Level C5 occupations correspond with the earlier range of the McKean complex.

Chapter 12
Cultural Levels 6 and 7

12.1 Introduction to Cultural Levels 6 and 7

Cultural Level 5 appears to be the deepest continuous occupation level at Meewasin Creek. It is important to note, however, that there are at least two ephemeral buried soils observed below Level C5 in which cultural remains were found. Eight units along the south wall were excavated deep enough to reach Level C6, and archaeological remains were found in six units (Figure 12.1). Level C6 is a faint dark sandy loam approximately 120 to 125 cm below surface at the western extent and 160 to 165 cm below surface in the eastern extent (Figure 5.2). It is separated from Level C5 above by a 30 cm layer of loamy sand.

Level C7 is less well represented, occurring only in unit 22S 1E, approximately 132 to 140 cm below surface. The level is separated from Level C6 by 4 cm of loamy sand. Because of time constraints and the limited amount of cultural and faunal remains found, it was not deemed necessary to excavate below Level C5 across the entire site. The following paragraphs outline the archaeological remains and describe the discontinuous nature of the cultural layers. No diagnostic artifacts or chronometric ages were obtained for either Level C6 or Level C7.

12.2 Level C6 Lithic Assemblage

The lithic assemblage is scarce. One quartzite primary flake was recovered from the profile of the south wall of unit 22S 2E. One grey chert piece of shatter was from 22S 4E. No FCR was found in this level, however, in unit 22S 0E, there were several disintegrating granite and schist pebbles, but they were not evidently heat altered.

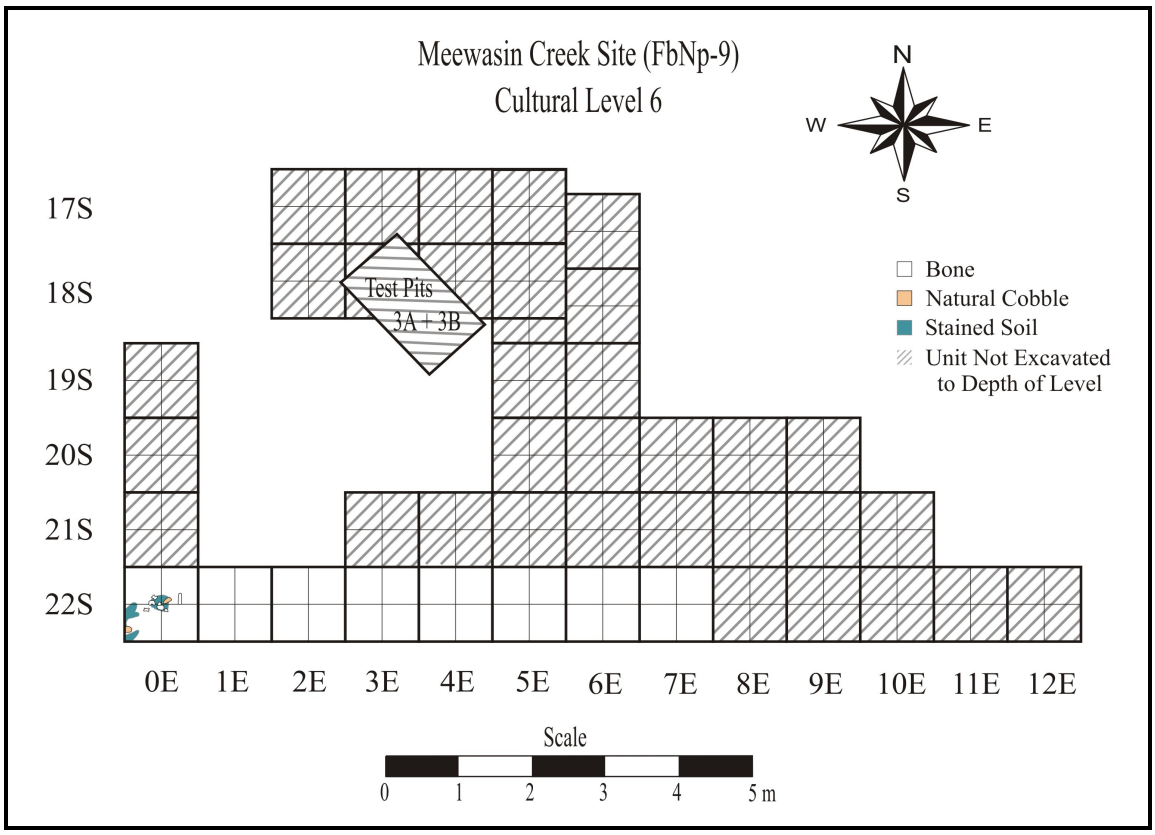

Figure 12.1 Cultural Level C6.

12.3 Level C6 Faunal Assemblage

Faunal remains at this depth were in poor condition and not numerous enough for radiocarbon analysis. Bone was found in units 22S 0E, 22S 1E, 22S 5E, and 22S 7E, with a higher concentration of bone in unit 22S 0E. The faunal assemblage amounts to a total of 239 specimens, with a mass of 623.7 g. All faunal specimens are attributed to either *Bison bison*, or greater taxonomic classification, presumably bison (Table 12.1). Consequently, the assemblage consists of an MNI of one within the entire level.

Table 12.1 Level C6 Faunal Taxa.

Taxon	NISP	Mass (g)	MNI
Bison bison	45	501.8	1
order Artiodactyla	17	81.9	-
class Mammalia	90	33.1	-
Total:	**239**	**623.7**	**1**

Identified elements are from the right distal fore-limb of a bison including the distal radius, four carpals, and two phalanges. Small unidentifiable fragments are scattered

throughout the units as well. No burned or calcined bone was found in this level. No cut marks or other cultural modifications are noticeable on the remains, which supports the possibility that the presence of the animal may be due to natural causes.

12.4 Interpretation of Level C6

Although there is evidence of activity in this level, it is not indisputably cultural. Rodent burrowing is likely the cause of the intrusion of the faunal materials in unit 22S 0E. A large rodent disturbance extends from the southwest corner of unit 22S 0E through the centre of unit. All of the identifiable bone represents elements from the distal forelimb of a bison, a portion considered less desirable by humans, yet easily scavenged by animals. These may have fallen or been carried through the soil by rodents. The presence of the flake and shatter associated with the faunal fragments does lend credence to a small brief occupation, but the remains are so scarce that little more can be deduced.

12.5 Cultural Level 7

The seventh cultural level is represented as an ephemeral dark stained sandy lens, found only in unit 22S 1E (Figure 5.2). The cultural remains consist solely of one artifact, a Swan River chert biface found embedded in the south wall 128 cm below surface (Figure 12.2; Catalogue #626). No further evidence of Level C7 was noted, however, few units were excavated to a depth great enough to encounter it. The lack of artifacts and thin lens of buried soil suggests a brief encounter, disturbed provenience, or an erosional episode.

Figure 12.2 Level C7 Biface.

Chapter 13
Terminal Middle Precontact Site Comparison

13.1 Terminal Middle Precontact Cultures on the Northern Plains

After reviewing the cultural assemblage of the Meewasin Creek site, it is important to consider the site within the larger Northern Plains context. Because there is relatively good stratigraphy and chronology in the lower levels of the site (Levels C3 to C5) and a reasonably accurate radiocarbon date associated with the little known Sandy Creek complex occupation recovered from Level 3A at Meewasin Creek, it is natural to next re-evaluate and explore the relationship among sites occupied during the Terminal Middle Precontact period on the Northern Plains.

The Terminal Middle Precontact period is a time of increased cultural complexity on the Northern Plains. This chapter focuses on the 2500 to 2000 B.P. time frame during which a number of cultural expressions are observed in the archaeological record including Pelican Lake, Sandy Creek, Besant, Plains Woodland, and previously un-named complexes. Archaeologists have traditionally explained the evolution of archaeologically defined cultures using projectile point typologies. Projectile points are conveniently diagnostic as the flaked stone points are small, durable, and stylistically change over time as the technology they represent changes. Assuming projectile points were created with a specific intent based on a culturally derived model about size, shape, lithic material used and eventual purpose, and taking into consideration variability due to individual ability of the flintknapper and limitations of the material, the point form can be used as a marker for noting the presence of culture change.

One of the challenges in defining this cultural complexity is the scarcity of projectile points found at sites during this time period. Kehoe (1974:104) writes, “rarely do more than a few Large Corner-notched points occur at any given site or in any one occupation zone.” Furthermore, there appears to be a florescence of culture(s) utilizing several projectile point styles, making it difficult to place points into prescribed cultural models.

Dyck and Morlan (1995:351) note, "the mixture of small numbers of corner-notched points with side-notched points (or vice versa) in Northern Plains sites dating to about 2000 to 2500 B.P. is not uncommon."

In order to place the Meewasin Creek site within a cultural chronology framework, it is necessary to first review and re-evaluate the current models as outlined in Chapter 3, and compare the site to other known sites in the region. Additionally, is necessary to reassess the transition of cultural components at multicomponent sites such as Mortlach, Sjovold, Walter Felt, as well as the single component Rocky Island site nearby. By comparing the lithic and faunal assemblages at these key sites, we can draw a better view of the cultural systems present on the Northern Plains. From this basis we can form a more holistic cultural chronology on the Northern Plains, particularly in central Saskatchewan.

13.1.1 Pelican Lake Corner-Notched Projectile Points

The Pelican Lake culture is recognized throughout the Northern Plains and into the Rocky Mountains by the presence of large, well-made triangular points. The diagnostic projectile point type and Pelican Lake culture was first defined by Wettlaufer (1955) at the Mortlach site in southern Saskatchewan, near Moose Jaw. Wettlaufer (1955:55) describes the point style as:

> corner-notched points with an oval cross-section. The workmanship is superb, with very fine parallel and diagonal flakes running across the specimens… These points are bevelled to the edges and toward the base. They are widest just above the notches and taper to a long symmetrical point. The base is somewhat narrower than the widest portion of the point, and… [sometimes] the bases are ground smooth.

Kooyman (2000:122) adds "Pelican Lake projectile points have sharply barbed corner notching and a triangular form that is much like a stylized Christmas tree…Basal and lateral edges vary from slightly convex to slightly concave."

In attempting to order the Middle Precontact point types into a chronological framework Kehoe (1974) organized the known Pelican Lake points into a number of

morphological variants within the "Large Corner-notched Point System." However, because of the small sample sizes the variants are rarely used. These variants can be stylistically simplified into two stages: the Pelican Lake I point style, found at sites dating from 3300 to 2800 B.P., is the classic triangular point with deep corner notches and straight sides; Pelican Lake II dates from 2800 to 1850 B.P. and is a more variable point style (Dyck 1983, Varsakis 2006). Dyck (1983:105) describes the earlier variety as follows:

> "straight sides, a straight base and corner-notches which usually leave sharp tangs on the shoulders… the earliest forms having the narrowest base, and the largest notches and an almost stemmed appearance. Toward the end of Pelican Lake time the base…has widened to almost the full width of the shoulders and the notches are narrower, although still quite deep while remaining situated either right on the corner or else on the side touching the corner."

The second stage of the Pelican Lake complex corresponds with a period of time when multiple point styles are observed in the archaeological record. The second variety, "has straight sides and corner notches but a convex, instead of straight, base…. The convex-based variety co-exists with the straight-based variety from the middle to the end of the Pelican Lake sequence" (Dyck 1983:105).

The straight and convex-based Pelican Lake points are seen as culturally distinct (Dyck 1983, Brumley and Dawe 1986). Brumley and Dau (1988:34-35) observed a varied geographical distribution of the two varieties in Alberta and a corresponding disparate lithic assemblage. Straight-based Pelican Lake appears to occur most commonly in collections throughout southeast and southcentral Alberta, and is rare in Montana. Straight-based Pelican Lake points from southern Alberta appear to be more often made on locally derived lithics or Knife River flint if exotic materials are used. Convex-based Pelican Lake is predominant in northern and central Montana and in the foothills and mountains of southwestern Alberta. A large percentage of convex-based Pelican Lake points from southern Alberta are made of lithics derived from quarry sources in central, southern, and western Montana; in particular, porcellanite and cherts.

Both straight-based and convex-based points are found in Saskatchewan, and will be discussed in the following pages.

13.1.2 Sandy Creek "Eared" Dart Points

The Sandy Creek complex was first identified at the Mortlach site (EcNl-1) located in southern Saskatchewan (Wettlaufer 1955). Wettlaufer (1955:52) described the atlatl dart point style as "short, thick, rather misshapen points… characterized by shallow open notches and slightly indented bases…thinned all the way across [the base]" The length ranged from 3.5 to 5.5 cm (Dyck 1983:108). Additionally, Kehoe (1974:110) described the diagnostic features as: "Straight to slightly convex sides; indented base that forms rounded ears and shallow side-notches that form a sloping shoulder."

The Sandy Creek complex is poorly represented in the archaeological record. Because the projectile point morphology resembles earlier Oxbow points, they are not often recognized without radiocarbon dating or unless found in association with other contemporaneous point styles. Additional sites in Saskatchewan with Sandy Creek points include the Walter Felt site (Kehoe 1974), the Sjovold site (Dyck and Morlan 1995), EgNn-9 and EgNo-23 in the Douglas Park Sandhills (Neal 2006), and the Lebret site in the Qu'Appelle Valley (Smith 1986). The Cranford site in south-central Alberta and the Bodo archaeological locality (FaOm-22) are two sites found in Alberta (CARD 2009).

13.1.3 Un-named Complex or Outlook Side-Notched Projectile Points

An un-named side-notched point complex was introduced by Dyck (1983) to account for a distinctive projectile point found in Layer XIV of the Sjovold site near Outlook, Saskatchewan. Similar points were found at Head-Smashed-In in southern Alberta (Reeves 1978) and the Rocky Island site in Saskatoon (Walker 1983b). The medium-sized projectile points exhibit straight to mildly concave bases, side-notching and a general lanceolate form. Later named Outlook Side-notched by Dyck and Morlan (1995), the complex was subsumed as a variant of what they call the Besant series, which includes Outlook, Bratton and Sandy Creek point styles. Dyck and Morlan (1995:433) describe the Outlook points from Sjovold as "side-notched with straight or very slightly concave bases. Notches are low on the sides... They are generally 'u' shaped and about

twice as broad as deep… Basal edges are either lightly crushed or lightly rounded… Basal width …was equal to maximum body width above the haft…" Furthermore, Dyck and Morlan (1995:437) apply the classification "Outlook" to the most common Besant projectile point style, encompassing all straight-based side-notched Besant points despite minor variation over time. Dyck and Morlan state, "The relatively narrow range of basal shapes evident in Sjovold Layer XIV, compared with the broader Outlook Side-notched type, may be an indication of what the type looked like at the time of Besant initiation" (1995:437).

The points at Sjovold and Rocky Island have a rather specific appearance as described above. For the purpose of this study, the name "Outlook" will remain only as a projectile point variety similar to those found at Sjovold Layer XIV with a wide base that is straight to slightly concave, with narrow, low-set side notches, and a general lanceolate form. Since the name "Besant" has precedence in the literature (Wettlaufer 1955) and the adoption of the "Outlook" is not widespread, the name Besant remains as the broader phase designation encompassing the more varied point types.

13.1.4 Besant Side-Notched Points and Woodland Influences

The Besant culture is a widespread complex with a number of associated elements (discussed in Chapter 3), but is primarily recognized by the characteristic side-notched projectile point. The Besant point type and subsequent cultural complex was first recognized by Wettlaufer (1955) at the Mortlach site and named after the Besant Valley where the site is located. Besant components are found across the Northern Plains and Parklands from Manitoba through Alberta, the Dakotas, Montana, and as far south as Wyoming, at the Ruby site (Frison 1971).

Projectile points were first described as "short and broad with shallow side notches and a slightly concave base… [The base] is thinned" (Wettlaufer 1955:44). The point type has expanded to encompass more varied point styles. Besant side-notched points are lanceolate with notches about twice as wide as they are deep (Dyck 1983:115). The notch is often placed low on the point and may even remove the basal edge, giving a corner-notched appearance (Reeves 1983, Kehoe 1974). Points are 30 to 78 mm long, 19

to 23 mm wide and have an inter-notch width of about 14-16 mm (Dyck 1983:115). Bases are often thinned and ground. The quality of the manufacture is variable.

The Besant complex is often recognized as a culture in transition from the use of atlatl darts to the bow and arrow as well as the incorporation of pottery during this time. There was an increased proficiency in large-scale bison jumps and pounds and other technological advances. Samantha points are morphologically similar to Besant but with smaller dimensions and may represent the transition from atlatl dart point to arrow point between approximately 1550-1250 B.P. (Kehoe 1974, Vickers 1986).

The Plains Woodland cultural complex refers to the group of people from the Missouri River area that moved onto the Plains from the eastern United States. Plains Woodland sites are characterized by the presence of thick pottery conical in shape with straight sides and fabric impressed surface representing thick, utilitarian vessels. Johnson and Johnson (1998:218) explain, "The Besant phase and Middle Plains Woodland sites are used interchangeably when sites on the Northern Plains are burial mounds or contain Woodland Pottery."

Neuman (1975) defined the Sonota complex, interpreted as a Besant manifestation characterized by bison hunting and exploitation of the Plains riverine environments of north-central North America, extending to the west into portions of southern Saskatchewan and Alberta, Montana, and in the western part of the Dakotas. Syms (1977) extended the geographical area of the Woodland influences into southern Manitoba. The complex is recognized by the emphasis on bison procurement, tools made from Knife River flint, projectile points similar to Besant and Samantha side-notched forms, upright bones in kill sites, and small burial mounds containing multiple bundle burials as well as bison remains.

13.1.5 Other Late Precontact Projectile Point Varieties in Saskatchewan

Danker and Bracken are two rarely used varieties of Kehoe's (1974) Large Corner-notched Point System that have been described as transitional between Pelican Lake and Besant. The Danker Shouldered, straight base variety is considered a transitional point between Pelican Lake and Besant with a "triangular outline with straight sides…[and an] over-all 'sharp' appearance that characterizes Pelican Lake points. The broad body and

neck… give it the Besant appearance… The base is narrower than the body, straight or sometimes slightly convex" (Kehoe 1974:111). The notches are wide and shallow. Occupations with Danker points were found below Besant occupations and above Sandy Creek (Kehoe 1974:111). The Bracken Shouldered, convex base variety was first noted at the Bracken Cairn site, a Pelican Lake internment. The point style is described as having "wide corner-notches and straight shoulders, and a convex base, which is ground smooth as in Besant points" (Kehoe 1974:111).

This form may be comparable to the Bratton variety first found at the Sjovold site exhibiting a convex base, acute shoulders, and narrow and deep side notches positioned just above the base (Dyck and Morlan 1995:377-379). Similar points have been found at the single component Rocky Island site in Saskatoon. Bratton points may have either corner or side notches, or both on a single specimen. Similar points have been found throughout the Northern and Central Plains at both Pelican Lake and Besant sites dating to approximately 3000 to 1300 B.P. (Dyck and Morlan 1995:378-379).

13.2 Site Comparison

To understand the chronological framework at Meewasin Creek site in relation to other sites in the region, one must consider four sites that have one or more components dating to the Terminal Middle Precontact approximately 2500 B.P. The sites were chosen because they were excavated using controlled measures, thus ensuring the projectile points and artifacts can be discussed within an archaeological context. Moreover, the sites were relatively well preserved, which has allowed for analysis and interpretation in various degrees.

The sites are compared as to their setting, site type, stratigraphy, lithic tools, lithic material, and faunal analysis regarding the taxa present and subsistence strategies where possible. It is important to observe the processes of change at the sites, not simply the elements of change, so the progression of cultural assemblage preceding and following the target time period is reviewed and compared. The primary focus of the study is Sandy Creek and coeval cultures, but the neighbouring strata are included in the review of multicomponent sites to understand the evolution of site use.

13.2.1 Mortlach Site

The Mortlach site (EcNl-1), was the first large scale, multidisciplinary archaeological excavation in Saskatchewan and became the type site for several archaeological cultures including Besant, Sandy Creek, and Pelican Lake. The site is located on a terrace above a small meandering creek in the Besant Valley near the town of Mortlach in southern Saskatchewan. The site was excavated by Boyd Wettlaufer in the early 1950s and the site contains short-term campsite occupations dating from the Protohistoric through to the Middle Precontact. It is not known how extensively the associated bison drive was used. Of interest to this study are the Sandy Creek occupations layer 4D and 4E and the layers immediately preceding and following.

Wettlaufer (1955) originally defined one Sandy Creek component (4E) below four Besant occupation levels. Despite strong doubts, Wettlaufer (1955:80) was hesitant to differentiate layers 4C and 4D from Besant, and included them based on lithic material types and general assemblage similarity. These layers are re-defined as two Sandy Creek occupations (4D and 4E) below two Besant levels (4A and 4B) and one undefined cultural occupation, possibly Pelican Lake (4C). Current analysis was limited to the site report and photographs. A thorough hands-on re-analysis of the collection may clarify ambiguities in the interpretation of the cultural assemblage, but is beyond the scope of this thesis.

Besant Occupational Layers (4A – 4B)

Characteristic Besant dart points were found in layers 4A and 4B (Wettlaufer 1955: Plates 6,7). A Pelican Lake point was found in layer 4A, but was assumed to be intrusive. Bone fragments and fire-cracked rock were associated with both layers.

The tool kit included “semi-lunar” and “ovoid” blades, various scrapers, drills, and utilized flakes. Chipping debris, partially completed points and the presence of a hammerstone in layer 4B indicates tools were manufactured on site. The most common debitage material is called “crypto-crystalline chert,” which may represent Knife River flint, an ultra-fine grained chert. In this early study specific lithic types and sources were not well known. Swan River chert was not identified at the site, but may have been

present, interpreted as "cherty quartzite." Table 13.1 outlines the lithic debitage present in layers 4A through 4C.

In layer 4A a lodge structure was present evidenced by post holes (Wettlaufer 1955: 41-43). Bone artifacts include remnants of bone bead manufacture and a pendant (4A), and an incised bone specimen (4B). A bone sample from the layer 4B returned with a radiocarbon age of 1580 ± 325 (Wettlaufer 1955:46).

Table 13.1 Lithic Debitage at the Mortlach Site (Levels 4A – 4C).

	4A Besant		4B Besant		4C	
Material	**#**	**%**	**#**	**%**	**#**	**%**
Agate	2	1.1	11	3.6	3	4.1
Chert	6	3.3	4	1.3	3	4.1
"Crypto-crystalline Chert"	54	30.0	162	53.6	32	43.2
Chalcedony	43	23.9	28	9.3	9	12.2
Jasper	4	2.2	4	1.3	2	2.7
Obsidian	-	-	-	-	-	-
Quartz	1	.6	12	4.0	5	6.8
Quartzite	33	18.3	40	13.2	7	9.5
Silicified Wood	37	20.6	41	13.6	13	17.6
Total	**180**	**100**	**302**	**100**	**74**	**100**

Occupational Layer 4C

A single projectile point was recovered from this occupation (Wettlaufer 1955:Plate 8). The acute shoulders and straight base is diagnostic of the Pelican Lake culture and may have been reworked multiple times. Tools include blades and scrapers, including an obsidian scraper.

Sandy Creek Occupations (Layers 4D – 4E)

Wettlaufer (1955:50-51) defined the Sandy Creek occupation as a separate cultural entity based on three factors: a different projectile point type, the addition of a different type of scraper, and the presence of several bone tools including a flaked bone tool. Originally only layer 4E was identified as Sandy Creek by Wettlaufer (1955), but layer 4D is included here as it contains two Sandy Creek-like points with convex bases and

rounded “ears” (Wettlaufer 1955:Plate 9). Dyck (1983:109) and other researchers have also included level 4D as a Sandy Creek level.

Lithic material of the three projectile points and three point fragments recovered from Level 4D were made of Swan River chert and silicified wood (Wettlaufer 1955:49). One midsection resembles Pelican Lake (Plate 9; No.5). Six points and point fragments were recovered from occupation zone 4E described as “crude, thick” (Wettlauffer 1955:79; Plate 10, No.1,2). Other Sandy Creek tools within the level include various scrapers and blades, or flakes with a scraper-edge. Several bone tools were present in layer 4E, some of which appear to have been flaked with a stone. The Sandy Creek culture used a similar tool kit as Pelican Lake, as there was evidence of domed-end scrapers and bone tools in layer 4E and deeper occupations (layer 7). Also present are miscellaneous bone tools, a clam shell fragment, and a possible bone gaming piece from layer 4E.

The most frequent type of lithic debitage is “crypto-crystalline chert” which may be Knife River flint. Other lithic material chosen includes local cherts, not necessarily of the best quality. Aside from the possible KRF, very little imported materials were noted, but a red jasper endscraper was present. A crystalline quartz was present in the form of an attempted tool, which Wettlaufer (1955:51) deems “desperation material.” Other materials include quartzite and chalcedony. Table 13.2 below compares the Sandy Creek and Pelican Lake lithic debitage.

Table 13.2 Lithic Debitage at the Mortlach Site (Levels 4D – 7).

	4D Sandy Creek		4E Sandy Creek		Total Sandy Creek		5A Pelican Lake		7 Pelican Lake		Total Pelican Lake	
Material	**#**	**%**	**#**	**%**	**#**	**%**	**#**	**%**	**#**	**%**	**#**	**%**
Chert	4	2.6	4	3.6	8	3.1	7	5.6	4	21.1	11	7.6
“Crypto-crystalline Chert”	99	65.1	47	42.7	146	55.7	63	50.0	-	-	63	43.4
Chalcedony	14	9.2	15	13.6	29	11.1	10	7.9	2	10.5	12	8.3
Jasper	2	1.3	6	5.5	8	3.1	1	.8	-	-	1	.7
Obsidian	1	.7	-	-	1	0.4	-	-	-	-	-	-
Quartz	2	1.3	5	4.5	7	2.7	11	8.7	1	5.3	12	8.3
Quartzite	15	9.9	21	19.1	36	13.7	21	16.7	7	36.8	28	19.3
Silicified Wood	15	9.9	12	10.9	27	10.3	13	10.3	5	26.3	18	12.4
Total	**152**	**100**	**110**	**100**	**262**	**100**	**126**	**100**	**19**	**100**	**145**	**100**

No outstanding features were observed, but the material culture indicates the site was likely a short-term campsite. Hide tanning and hide working activities are evidenced by the presence of scrapers, a bone awl or needle, and a "large rough blade worn smooth on one side was probably used as a tanning tool" (Wettlaufer 1955:51).

The floor of occupation layer 4E was fairly steep as the ground surface was along the bank of an old stream channel. A charcoal sample provided an uncorrected date of 2400 ± 290 radiocarbon years B.P. (S-28) (Wettlaufer 1955:71) [2400 ± 173 B.P. (CARD 2009)]. The Sandy Creek and previous dates correlate with known drought periods in the area, and indicate that people and animals were seeking refuge and water near the streams and lakes (Wettlaufer 1955:75). Seasonality was not interpreted.

Pelican Lake Occupation (Layers 5A – 7)

Underlying the Sandy Creek occupations Wettlaufer (1955:54-57) describes four Pelican Lake components: occupation 5A "Pelican Lake," occupations 5B and 6 "Early Pelican Lake," and occupation 7 "Ancestral Pelican Lake." These occupations are interspersed by multiple thick sandy layers that represent dry periods followed by heavy floods. Pelican Lake characteristics include: "the use of well-made corner-tanged projectile point, a domed scraper and the use of chipped bone tools" (Wettlaufer 1955:79). The Pelican Lake levels of the site were interpreted as repeated campsite use where the inhabitants conducted hide-working and other domestic activities.

Projectile points found in the Pelican Lake levels include six very well made points in layer 5A, one in each 5B and 6, and a point tip in layer 7 (Wettlaufer 1955:54-57). The material types are fine quality brown chalcedony that may be Knife River flint, moss agate, yellow jasper, and cherts. Isolated corner-notched points nearly identical to those in layer 5A were found in the younger layers 4C and 4A and are believed to have originated from the deeper component. Aside from the points present, the lithic assemblage consists of a poor variety of scrapers, blades and lithic debitage. In layer 5A, there were two somewhat oval-shaped blades, one well made brown chalcedony flake scraper, and three chisel-like curved scrapers. Deeper Pelican Lake levels include a grey chert end/sidescraper, a brown chalcedony flake scraper, two ovoid blades, and three domed scrapers. As mentioned above, two bone tools were noted, one with flakes

removed, and the second a concave scraper-edged flake. Red ochre was present in level 6. A number of large bison bones were found in layer 7. The Pelican Lake layers have not been dated although a bone sample from a Duncan (Thunder Creek) occupation in layer 8 was dated to 3400 ± 200 radiocarbon years B.P. (Wettlaufer 1955:71).

13.2.2 Sjovold Site

The Sjovold site (EiNs-4) is a multicomponent precontact archaeological site located in south-central Saskatchewan, southwest of the town of Outlook. The site is situated on the west bank of the South Saskatchewan River, just east of the Missouri Coteau. Excavated from 1979-1980, the site contains a sequence of 21 cultural occupations representing the past 4000 years with a series of 24 radiocarbon dates (Dyck and Morlan 1995). The oldest level is Hanna, and a sequence of occupations continues through to the historic period including Pelican Lake, Besant, Samantha, Avonlea, Moose Jaw, as well as undetermined archaeological cultures due to a lack of diagnostic artifacts.

Layers XII and XIV are important to this discussion as they contain projectile points and have been chronometrically dated to 2500 to 2300 years ago. The layers directly above and below are essential to review in order to understand the progression of Pelican Lake and Besant cultures and the intervening Sandy Creek and "un-named" occupations. It is important to review the Terminal Middle Precontact occupations in order to understand the processes of cultural change at the Sjovold site. Layer X is a stratigraphically mixed Besant and Pelican Lake occupation, Layer XI is Bratton (Besant), and Layer XII is a Sandy Creek occupation (Dyck and Morlan 1995:108-109). Cultural Layer XIV contains a number of distinct points that Dyck and Morlan name Outlook Side-notched (1995:437). A number of unidentified campsites are below this, preceded by two Pelican Lake components (Layers XIX and XX). Table 13.3 lists the chronometric and interpolated ages of Layers X through XIX. The following is a brief discussion of Layers X through XIX which show a progression from Besant through Pelican Lake occupations.

Table 13.3 Sjovold Site Chronology and Cultural Affiliation.

Layer	Cultural Affiliation	Chronology Calibrated years B.P.	Uncalibrated Age B.P.	Calibrated Age B.P. (2-sigma)	Lab No.
X	Besant/ Pelican Lake	2300-2100	2090 ± 165	2430-1700	S-1767
			2190 ± 140	2490-1870	S-3366
			2340 ± 120	2750-2060	S-3367
XI	Bratton	2500-2200	2505 ± 90	2780-2350	S-2058
			2900 ± 70	3260-2860	S-3365 *R*
XII	Sandy Creek	2600-2300	2355 ± 105	2740-2140	S-2059
XIII	unidentified	2700-2400	-	-	Interpolation
XIV	Outlook	2800-2500	2500 ± 85	2770-2350	S-1768
XV	unidentified	2900-2600	-	-	Interpolation
XVI	unidentified	3000-2700	-	-	Interpolation
XVII	unidentified	3200-2900	-	-	Interpolation
XVIII	unidentified	3500-3100	-	-	Interpolation
XIX	Pelican Lake	3700-3400	3275 ± 160	3900-3160	S-1769
R = Date rejected. Table adapted from Dyck and Morlan 1995:92-97,108-109					

Layer X

Six projectile points and three point preforms that resemble both Besant (side-notched) and Pelican Lake (corner-notched) forms with straight to slightly convex bases were found in the Layer X archaeological assemblage made of Knife River flint and jasper (Dyck and Morlan 1995:350-351). Three points were statistically determined to be arrow points and a fourth is a dart point (Dyck and Morlan 1995:350-351). Three radiocarbon dates were averaged for a proposed occupation date of 2200 ± 100 calibrated years B.P. (Dyck and Morlan 1995:95).

Table 13.4 Sjovold Site Features and Tool Kit.

Level	Hearths Features	Other Features	Points (Preforms)	Anvil/ Hammerstone	Biface	Chopper	Concave Scraper	Endscraper	Knife Scraper	MURLs	Perforators	Pièce Esquillée	Bone Tools
X	5	7	6 (3)	-	1	1	1	10	1	12	3	-	1
XI	5	4	3	-	4	10	-	10	-	18	-	-	1
XII	3	3	2	-	-	-	-	-	-	3	-	1	-
XIII	3	-	-	-	-	-	-	-	-	1	-	-	-
XIV	2	1	10	1	1	-	-	1	-	3	-	-	6
XV	1	3	-	-	-	-	-	-	-	-	-	-	1
XVI	-	(2)	-	1	-	-	-	-	-	-	-	-	-
XVII	1	1	-	1	-	-	-	-	-	-	-	-	2
XVIII	-	-	-	-	-	-	-	-	-	-	-	-	-
XIX	3	4	4	-	3	-	-	1	2	1	-	-	2

The archaeological assemblage for Layer X contains a large amount of coarse rock, chipping debris, and broken bone throughout the level (Dyck and Morlan 1995:333-361). Several hearths, stone piles and soil discoloration features indicate that there were several activities occurring at the site involving include two or more boiling operations and associated animal processing and consumption, as well as chipped tool manufacture or repair. Table 13.4 outlines the tools found, which includes a biface, chopper, concave scraper, several endscrapers, a knife scraper, perforators, and 12 MURLs (moderately utilized, retouched lithics).

The chipped stone debris is made of a variety of lithic material types, most of which are also found at Meewasin Creek. Table 13.5 below lists the lithic debitage of layers X through IX for comparison. There is a higher percent of Knife River flint tools than quartzite tools. Conversely, there was a higher percent of chipping debris made out of quartzite. This implies the occupants had access by travel or by trade with the flint quarries in North Dakota.

Table 13.5 Sjovold Lithic Debitage by Level.

	X		XI		XII		XIII		XIV		XV		XVII		XIX	
Material	**#**	**%**	**#**	**%**	**#**	**%**	**#**	**%**	**#**	**%**	**#**	**%**	**#**	**%**	**#**	**%**
Agate	13	1.9	4	.8	-	-	2	.6	-	-	-	-	3	8.8	-	-
Andesite	-	-	-	-	-	-	-	-	-	-	-	-	-	-	56	15.4
Chalcedony	6	.9	2	.4	-	-	6	1.7	-	-	-	-	-	-	-	-
Chert	65	9.4	28	5.7	2	5.4	7	2.0	5	2.4	-	-	5	14.7	19	5.2
Fused shale	-	-	-	-	-	-	-	-	56	26.8	1	2.4	-	-	-	-
Gronlid Siltstone	4	.6	5	1.0	-	-	-	-	-	-	-	-	-	-	-	-
Jasper	2	.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-
KRF	23	3.3	1	.2	19	51.4	19	5.5	129	61.7	1	2.4	9	26.5	16	4.4
Limestone	-	-	-	-	-	-	2	.6	-	-	-	-	-	-	-	-
Obsidian	1	.1	2	.4	-	-	3	.9	-	-	-	-	-	-	-	-
Petrified Peat	328	47.7	147	29.7	2	5.4	203	58.5	5	2.4	1	2.4	2	5.9	152	41.8
Petrified Wood	16	2.3	12	2.4	3	8.1	49	14.1	1	.5	3	7.3	-	-	61	16.8
Quartz	50	7.3	59	11.9	2	5.4	40	11.5	2	1.0	34	82.9	1	2.9	38	10.4
Quartzite	88	12.8	103	20.8	3	8.1	-	-	1	.5	-	-	-	-	6	1.6
Sandstone	1	.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Silicified Sediment	29	4.2	19	3.8	1	2.7	1	.3	4	1.9	-	-	4	11.8	4	1.1
SRC	60	8.7	112	22.6	5	13.5	15	4.3	3	1.4	1	2.4	9	26.5	9	2.5
Unident'd	2	.3	1	.2	-	-	-	-	3	1.4	-	-	1	2.9	3	.8
Total	**688**	**100**	**495**	**100**	**37**	**100**	**347**	**100**	**209**	**100**	**41**	**100**	**34**	**100**	**364**	**100**

The primary subsistence was based on the meat from at least four bison with evidence of supplemental diet from pronghorn and a wolf, as well as marrow procurement. Faunal evidence suggests the site was occupied during the late spring or early summer.

Bratton Layer XI

Layer XI was occupied by an undefined cultural complex between 2500 to 2200 B.P. (Dyck and Morlan 1995:96). A calibrated radiocarbon date of 2565 ± 215 B.P. (S-2058) was obtained from a large bison bone; a second assay was rejected (Dyck and Morlan 1995:92, 96).

Three Bratton projectile points (one complete) were recovered from this level (Dyck and Morlan 1995:377-379). The points are made of various qualities of material and finishing, including silicified sediment, petrified peat, and jasper, and are all believed to be arrowheads (Dyck and Morlan 1995:373,377-379).

Activities include hide scraping and cutting, cooking at hearths, stone tool manufacturing and rejuvenation, and a bone grease operation. The lithic debitage is similar to Layer X with quartzite, petrified peat, and Swan River chert the most common materials (Dyck and Morlan 1995:380). Exotic materials occur infrequently. The materials present indicate a dependence on local river valley resources. The material types used for tools can be generalized since quartzite was used for bifaces, Swan River chert for cutting edges (blades and MURLs), and petrified peat was used for all kinds of chipped stone tools. A bipolar core may be a *pièce esquillée* and used as a wedge or incising tool (Dyck and Morlan 1995:400-401). Also present at the site is a bone awl with localized wear.

The faunal remains indicate subsistence was based on bison hunting. There were four taxa present comprised of at least three bison (three age/gender groups), a medium mammal, a rabbit or hare, and a raven. Seasonality was undetermined.

Sandy Creek Layer XII

Layer XII is a Sandy Creek occupation with a calibrated age of 2450 ± 150 B.P.

(S-2059) (Dyck and Morlan 1995:92). A large (61 mm) Sandy Creek point made of Knife River flint was recovered from this level (Dyck and Morlan 1995; Figure 16.6). An incomplete second dart with a straight base was also recovered (Dyck and Morlan 1995:397).

Activities in this layer are located around three hearths with associated concentrations of hearth and occupation debris at the southeast corner and large quantities of coarse rock and FCR. Very few cutting tools were noted. A *pièce esquillée* that may have served as a wedge or incising tool was present. Knife River flint comprises over half of the lithic debitage and seven other types of materials are present in small quantities (Table 13.5). Knife River flint comprises 80% of the tools and is present in all stages of lithic reduction (Dyck and Morlan 1995:399-400). The lithic assemblage is slightly different as there is no petrified peat like in other levels.

Activities areas are peripheral to three hearths where rock heating took place, meat butchering, point repair and possible replacement, marrow extraction, cooking and likely eating. Subsistence is based primarily on bison hunting. At least two taxa are represented in three bison and a single carnivore gnawed deer limb bone. (Dyck and Morlan 1995:401-402).

Layer XIII

The archaeological cultural affiliation of the occupants of Layer XIII is difficult to determine because although three projectile points were present, they were too crudely made and incomplete to assign to a cultural affiliation. Dyck and Morlan (1995) determined the occupation was a campsite with three hearths for a small hunting or raiding party. The material assemblage consists of one MURL, an anvil, and flakes, which indicates that lithic tool production was taking place. Debitage consists of predominantly Petrified Peat and ten other materials including three pieces of obsidian (Dyck and Morlan 1995:418-419). There is an apparent effort to select the higher quality siliceous material that are often used for projectile points, rather than utilizing local materials like quartzite and cherts, that are more often used for utilitarian tools. Faunal remains consist of bison limb and cranial elements as well as a single deer or pronghorn rib and a canid phalanx (Dyck and Morlan 1995:419).

Outlook Layer XIV

Level XIV of the site contains distinct points called "Outlook Side-notched" previously called the "un-named complex" by Dyck (1983) and other archaeologists. A radiocarbon date on bone sample (S-2060) indicates an occupation of 2500 ± 85 uncalibrated years B.P. or 2560 ± 210 calibrated years B.P. (Dyck and Morlan 1995:92).

Features present include two hearths with charcoal, burned bone and chipped stone surrounding them and coarse rock debris (Dyck and Morlan 1995:425). Lithic tools include an anvil/hammerstone, bifacial knife, endscraper, three MURLs, and ten projectile points one of which is whole. Six of the ten projectile points are made of Knife River flint and the remaining four are made of Swan River chert, silicified sediment, fused shale, and buff-cream chert. Bone tools in the level include two bone awls, two pressure flakers, a hide grainer, and a chopper bit all from bone. Lithic debitage consists of 10 material types with Knife River flint comprising the majority of the assemblage (61.7%) (Dyck and Morlan (1995:437-438; Table 13.5).

The faunal remains indicate a subsistence of two juvenile bison, wapiti, and lynx, and a small mammal for hides or meat. There is evidence that the site was occupied as a campsite for only a short duration.

Layers XV - XVIII

The four occupations below Layer XIV are of unknown identity due to lack of diagnostic materials.

Layer XV contains a hearth feature and three clusters of FCR, chipping debris and bone fragments, but no tools. At least 4 taxa are represented in 8 bison bone fragments, 2 canid specimens, a smaller mammal, and a bird specimen (Dyck and Morlan 1995:456-457). Bison bones were recovered around a hearth that was believed to contain a bison stew, with possible supplemental nourishment from birds and pelican eggs. The site is believed to be a short term campsite for hunters in the summertime (Dyck and Morlan 1995:458).

Layer XVI is only a sparse scatter of stone, bone and charcoal around a small hearth. The one tool found was a hammerstone, which was not used much within the excavated area as only one quartz flake was recovered. Subsistence was based on portions of a

male and female bison. This represents a small transient occupation, likely in the summertime.

The cultural assemblage of Layer XVII includes two hearths with an associated roasting pit that caused extensive soil blackening. Charcoal, ash, and reddened earth were found throughout the level. Evidence of rodent burrowing and cultural disturbance initially marred the interpretation of the level. Tools present include a hammerstone and a bone awl, or un-eyed needle, and a bone hide grainer (Dyck and Morlan 1995:475-477). Lithic debitage is scarce (Table 13.5). Faunal remains indicate subsistence was based on two bison, and possibly a swift fox, rabbit or hare, gastropod, and unidentified mammal bones. The fox and hare may be intrusive and account for extensive burrowing and disturbed sediment (Dyck and Morlan 1995:447-448).

Layer XVIII is an ephemeral occupation with limited cultural remains consisting of a sparse scatter of a few bone fragments, FCR, and charcoal, most of which may be intrusive (Dyck and Morlan 1995:480-483).

Layer XIX

Layer XIX is interpreted as a Pelican Lake summer camp. The age of this occupation was calibrated to 3530 ± 370 B.P., obtained from large mammal bone fragments presumed to be bison (S-1769; Dyck and Morlan 1995:96). Features consist of three hearths, two hide-smoking pits, and two stake molds (Dyck and Morlan 1995:486). Activities include cooking and hide-smoking, and a midden or discard area, stone tool manufacture and rejuvenation, with possible hide fleshing, and hide tanning.

Four Pelican Lake points were recovered, two of which were made of Knife River flint, one petrified wood, and one silicified sediment: two dart points, one arrow point, and the fourth unclassifiable (Dyck and Morlan 1995:502-503). The points are described as classic in form with “straight sides, deep corner notches and straight, narrow bases,” and reminiscent of the Pelican Lake points from the Mortlach site (Dyck and Morlan 1995:502-503) The tool kit also includes two bone choppers, interpreted for digging holes (Dyck and Morlan 1995:504-505) and four bone gaming pieces with incised lines and smoothed corners and covered with red ochre. The debitage consists of materials used for tools at the site (or discarded elsewhere). Debitage patterns imply manufacture,

use and repair of large, medium, and small tools. All the tools contained chipping debris of the same material type, except the endscraper. No tools were made of petrified peat, quartzite, Swan River chert, quartz, or chert, and although such chipping debris is present, implying the tools were made and carried away.

There are at least eight taxa represented at this assemblage including five mammals and three birds. Bison are represented in at least four individuals. Identified faunal remains include a canid, marten or fisher, snowshoe hare, small rodent and a raven. The subsistence was based on bison hunting, and possibly canid, hare, and marten. The marten, canid and bird remains may represent ornamental or other non-dietary cultural purposes as well as minor dietary supplement.

13.2.3 Walter Felt

The Walter Felt site (EcNm-8) is a pound site located in south-central Saskatchewan, 8 km south of the town of Mortlach situated on a high terrace below the Missouri Coteau and overlooking a network of coulees and Long Creek. The site is a deeply stratified, multicomponent site with 12 occupation levels separated by sterile layers (Kehoe 1974). The site was excavated by the Saskatchewan Museum of Natural History (now the Royal Saskatchewan Museum) in the 1960s. Associated with the site are drive lanes leading to the escarpment (Kehoe 1973). The buried bases of wooden corral poles and supporting bone uprights were discovered in the upper levels during excavation (Kehoe 1973:164). There was no evidence that the site was used as a pound in the earlier occupations, which suggests a different hunting process was employed (Kehoe 1974:103-104,113). The site was used as a camp for over two thousand years (Kehoe 1974:113).

Excavations at the Walter Felt revealed a total of 552 projectile points of which 342 were complete enough for Kehoe (1966) to develop the "Small Side-notched point system." Thirty-five projectile points from Walter Felt were used to define the "Large Corner-notched Point System of the Northern Plains" (Kehoe 1974). Points from other sites such as Mortlach (Wettlaufer 1955), Long Creek (Wettlaufer and Mayer-Oakes 1960), Boarding School Bison Drive (Kehoe 1967), Old Women's Buffalo Jump (Forbis 1962), among others, were used as comparison.

Radiocarbon assays were obtained from three occupations associated with the Large Corner-notched Point System. The Sandy Creek Layer (15b) has an uncorrected radiocarbon date of 2430 ± 90 B.P. (S-279), the Besant Layer 13 has an uncorrected radiocarbon date of 1610 ± 70 B.P. (S-200) and Layer 10, a transitional Samantha occupation, has an uncorrected radiocarbon date of 1535 ± 80 B.P. (S-201) (Kehoe 1973:164).

A total of 26 projectile points (six complete) were determined to be Pelican Lake. Layer 15d contained 4 Large Classic Pelican Lake points comprised of brown chalcedony, Knife River flint, and white quartzite (Kehoe 1974:109-110). Two Small Classic points were from layer 15d and one from between layers 10 and 13, made of chalcedony, petrified wood, and quartzite, respectively (Kehoe 1974:110). Three Sandy Creek points (two complete) were found in layer 15b made from petrified wood and one from quartzite (Kehoe 1974:110-111). Layer 15a contained 16 (one complete) Danker variety points, ten of which were made of quartzite, four of chalcedony, and two petrified wood (Kehoe 1974:111).

Layer 13 is the only Besant level. Four of the nine points and point fragments were made of petrified wood, and the remaining were of chalcedony, chert, jasper, argillite and quartzite (Kehoe 1974:108).

There were 27 Samantha points recovered from layers 3 though 13, which are considered a Late Besant transitional point type between the Large Corner-notch System (atlatl points) and the Small Side-notched Point System (arrow points) (Kehoe 1974:103,113). Large and small Samantha points are found in layers 3 though layer 13 (Kehoe 1974:111-113). Two Large (transitional) Samantha points were found in layer 13; Layer 12 contained two small Samantha points; and layer 10 contained seven large and twelve small Samantha points (Kehoe 1974: 111-113).

A comprehensive site report has not been published for this site which limits any further discussion concerning the artifact assemblage. An unpublished manuscript pertaining to the site was also not available.

13.2.4 Rocky Island

The Rocky Island site (FaNp-7) is a single component habitation site in north-central Saskatoon. The site is located on a middle terrace of the southeast bank of the South Saskatchewan River. Excavations in the early 1980s and mid 1990s prior to the expansion of the Circle Drive Bridge revealed the presence of a precontact site comparable in age to the Meewasin Creek site. A radiocarbon date of 2475 ± 120 B.P. (S-2437) corresponds with Meewasin Creek's Level 3A uncalibrated age of 2405 ± 50 B.P. Despite close proximity in time and space, the projectile point styles are quite different from the Sandy Creek point at Meewasin Creek. A nominal examination of the test excavation and associated tools was undertaken (Walker 1983b, Friend-Heath 1995).

Aside from a few historic artifacts from the surface and sparse remains as deep as 40 to 60 cm below surface, the majority of artifacts were found within a single component at a depth of 16 to 33 cm below surface. The most distinctive set of features at the site are nine hearths roughly forming three lines running east to west. Other features include a post hole and six flake concentrations.

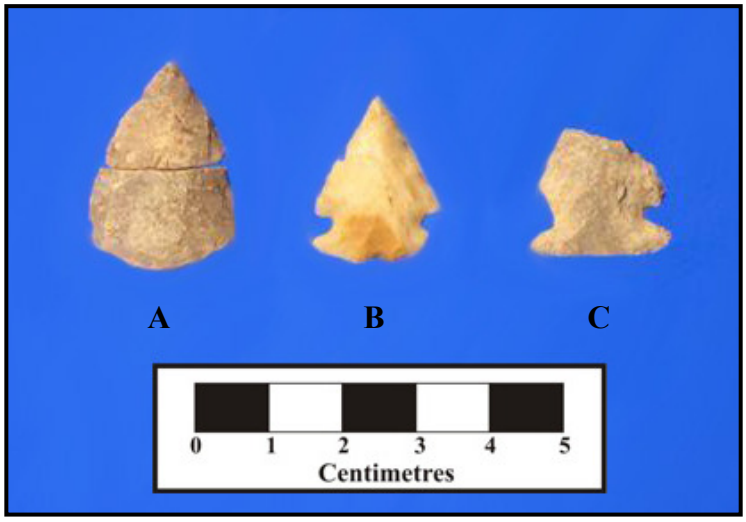

Figure 13.1 Projectile Points from the Rocky Island Site.

Three projectile points were recovered from the Rocky Island site (Figure 13.1). Since the projectile point analysis from the site is unpublished elsewhere, the metric and non-metric data are listed in Appendix C Tables C.10 and C.11. A broken unnotched chalcedony preform was found 17 cm below surface (Figure 13.1:A). The flaking is

moderate, but the body is thinner, and the base is ground. The base is convex, resembling a Bratton point as defined by Dyck and Morlan (1995:377-379). A yellow chert projectile point was recovered from 18 cm below surface (Figure 13.1:B). The moderately well-flaked point is symmetrical with straight, sharp sides, deep side-notches positioned close to the convex, thinned base. A small basal notch is located in the centre of the base, one basal corner has broken, and one side has been chipped. The point has not been ground and contains several small step fractures, which suggests it may either have been chipped poorly during manufacture and discarded, or may have chipped during impact. The third point (Figure 13.1:C) is a light blue-grey mottled Swan River chert point is missing the tip and a shoulder, but maintains characteristics consistent with the Outlook Side-notched variety defined by Dyck and Morlan (1995). The base is straight and one notch is from the side, near the base; the other appears more corner-notched. The quality of flaking is moderate, as the outline is well defined, the centre is robust, but the quality of material is only moderately uniform, causing step-fractures and irregular flake scars. This point was found 19 cm below surface. Additionally, three point tips from Level 3 (20 to 30 cm below surface) were recovered. The points, particularly Figure 13.1:C, show a remarkable similarity to Catalogue # 4053 in Level C3 of the Meewasin Creek site (Figure 8.1:A).

Tools recovered from the site include ten endscrapers, eleven sidescrapers, fourteen edge-modified cutting tools, three bifaces, four perforators, and one large Swan River chert chopper. Lithic material recovered during the test excavations is comprised predominantly of Swan River chert (87.2%) although a number of other materials are present in smaller quantities (Table 13.6). A large quartzite hammerstone was recovered that may have been hafted. Nineteen Swan River chert cores were recovered signifying local tool manufacture as well as rejuvenation and discard of old tools. The artifact assemblage suggests that the site was a hide processing workstation.

Although the entire faunal assemblage of the site has not been analyzed, a brief discussion of the faunal remains from the eight 1983 test units adds to the site interpretation. Two taxa were identified with a minimum number of individuals at two, one mature bison and one rodent, likely intrusive (Friend-Heath 1995:37). The presence of freshwater clam shell fragments in several units may have added to subsistence or

may have been used for beads or gorgets. Only one small piece (.1 g) is calcined, and none are burned. No other taphonomic marks were noted. Seasonality is not yet determined.

Table 13.6 Rocky Island Debitage (Test Excavations).

Material Type	Count	%	Mass	%
Basalt	133	3.5	23.0	1.6
Chert	7	.2	17.0	1.1
SRC	3357	87.2	1188.8	80.2
KRF	309	8.0	109.4	7.4
Obsidian	4	.1	0.4	< .1
Quartzite (Rocky Mountain)	10	.3	15.1	1.0
Quartzite (Athabasca)	5	.1	94.9	6.4
Silicified Peat	22	.6	12.8	.9
Silicified Wood	1	< .1	1.7	.1
Siltstone (Gronlid)	2	.1	19.7	1.3
Total	**3850**	**100%**	**1482.7**	**100%**

13.2.5 Site Comparison Summary

Meewasin Creek, Mortlach, Sjovold, Walter Felt and Rocky Island sites share a number of similarities. The sites are located on terraces or benches above prominent water courses. Meewasin Creek, Rocky Island and Sjovold are all located adjacent to the South Saskatchewan River whereas Mortlach is near the smaller Sandy Creek and the Walter Felt site is above Long Creek. Although Sandy Creek is small, it is connected to Pelican Lake, a large freshwater lake to the north. The Walter Felt site is located within the Missouri Coteau and the Sjovold and Mortlach sites are near the periphery of the Coteau. Both the South Saskatchewan River and the Coteau are prominent landforms which would present both a physical obstacle and an attraction for game and resources.

The Terminal Middle Precontact components exhibit a comparable lifestyle with similar activities such as bison hunting, processing, hide preparation, cooking, and associated tool manufacture and rejuvenation. Despite variations in tool types and quantities, there is a general continuity of tool use including scrapers, fleshers, modified edge flakes and awls which are all present during the study time.

The deeply stratified sites have multiple occupation levels from the Middle Precontact to the present. Comparing projectile points from multicomponent sites shows a common progression with McKean series occupation(s) in the deeper levels followed by Classic Pelican Lake occupation(s). Approximately 2500 years ago a number of point

styles emerge. The Outlook points are noted at Sjovold and Rocky Island sites, and Sandy Creek points appear shortly after, underlying Besant occupation(s). Besant point styles are somewhat variable and Pelican Lake points, believed to be intrusive, have been found in some Besant occupations (at the Mortlach and Sjovold sites). Table 13.7 and Figure 13.2 display the radiocarbon ages of the Middle Precontact occupations discussed.

Table 13.7 Comparison of Terminal Middle Precontact Radiocarbon Dates Discussed.

Site	Level	Cultural Affiliation	Uncorrected (B.P.)	Corrected (B.P.)	Sample #
Meewasin Creek FbNp-9	2/3	-	1754 ± 45	1660 ± 45	BGS 2742*R
	3	-	2130 ± 125	-	S-2366
	3A	Sandy Creek	2405 ± 50	2360 ± 50	BGS 2740
	4B	-	2286 ± 70	2340 ± 70	BGS 2743
	5A	-	3750 ± 120	4120 ± 120	BGS 2741
Mortlach EcNl-1	4B	Besant	1580 ± 325	1660 ± 159	S-22
	4E	Sandy Creek	2400 ± 290	2400 ± 173	S-28
	8	Duncan (Thunder Creek)	3400 ± 200	3480 ± 200	S-2
Sjovold EiNs-4	10	Besant/Pelican Lake	2090 ± 165	2065 ± 365	S-1767
	10	Besant/Pelican Lake	2190 ± 140	2180 ± 310	S-3366
	10	Besant/Pelican Lake	2340 ± 120	2405 ± 345	S-3367
	11	Bratton	2505 ± 90	2565 ± 215	S-2058
	11	Bratton	2900 ± 70	3060 ± 200	S-3365*R
	12	Sandy Creek	2355 ± 105	2440 ± 300	S-2059
	14	Outlook	2500 ± 85	2560 ± 210	S-2060
	16	unidentified	2680 ± 165	2785 ± 435	S-1768
	19	Pelican Lake	3275 ± 160	3530 ± 370	S-1769
	20	Pelican Lake	3595 ± 150	3745 ± 195	S-2061
Walter Felt EcNm-8	10	Besant (Samantha)	1535 ± 80	-	S-201
	10	Besant (Samantha)	1535 ± 90	-	S-260
	13	Besant	1610 ± 70	-	S-200
	15b	Sandy Creek	2430 ± 90	-	S-279
Rocky Island FaNp-7	1	Bratton/Outlook	2475 ± 120	-	S-2437

References include Wettlaufer (1955), Dyck and Morlan (1995), Kehoe (1973), Linnamae *et al.* (1988), and CARD (2009). *R = Rejected date. Corrected dates are measured to 2-sigma.

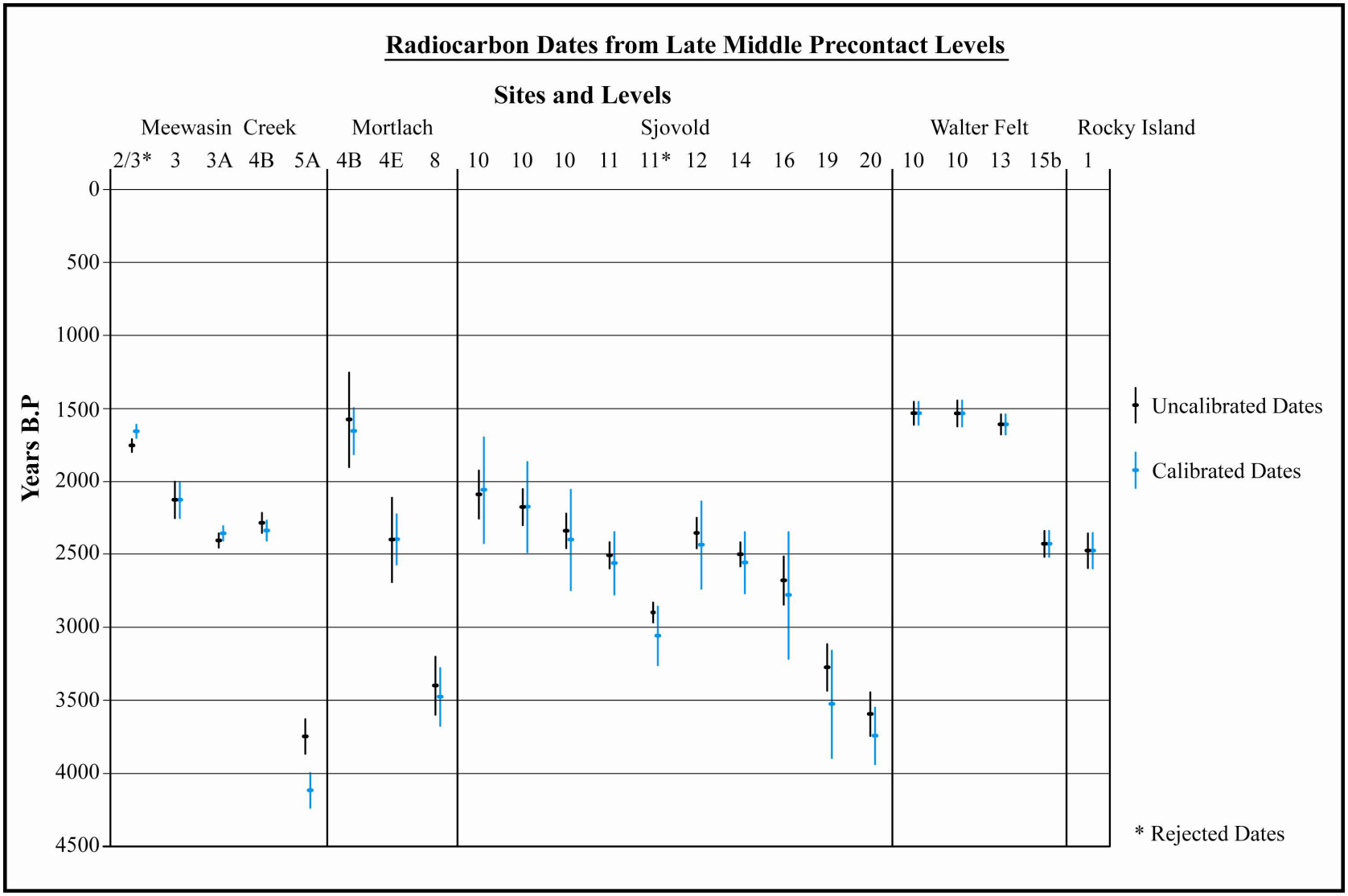

Figure 13.2 Comparison of Radiocarbon Dates from Late Middle Precontact Levels.

Sandy Creek Comparison

Sandy Creek projectile points are made of both local materials including petrified wood, quartzite and chert, as well as Knife River flint. Tools include edge modified tools, endscrapers, bone fleshers; all tools consistent with hide working. Sites are interpreted as short-term campsites. Faunal analyses at Sjovold and Meewasin Creek sites indicate that subsistence is based on low numbers of bison remains.

The lithic material found at Sandy Creek sites is varied. If the "crypto-crystalline chert" described at the Mortlach site refers to Knife River flint, then the occupations are consistent with the Sjovold site which also contain a high percentage. Figure 13.3 demonstrates the Meewasin Creek site more closely resembles the neighbouring Rocky Island site which is dominated by over 3,000 pieces of Swan River chert debitage. Proximity to lithic quarry or the importance of the material may be factors in the quantity of lithic materials present.

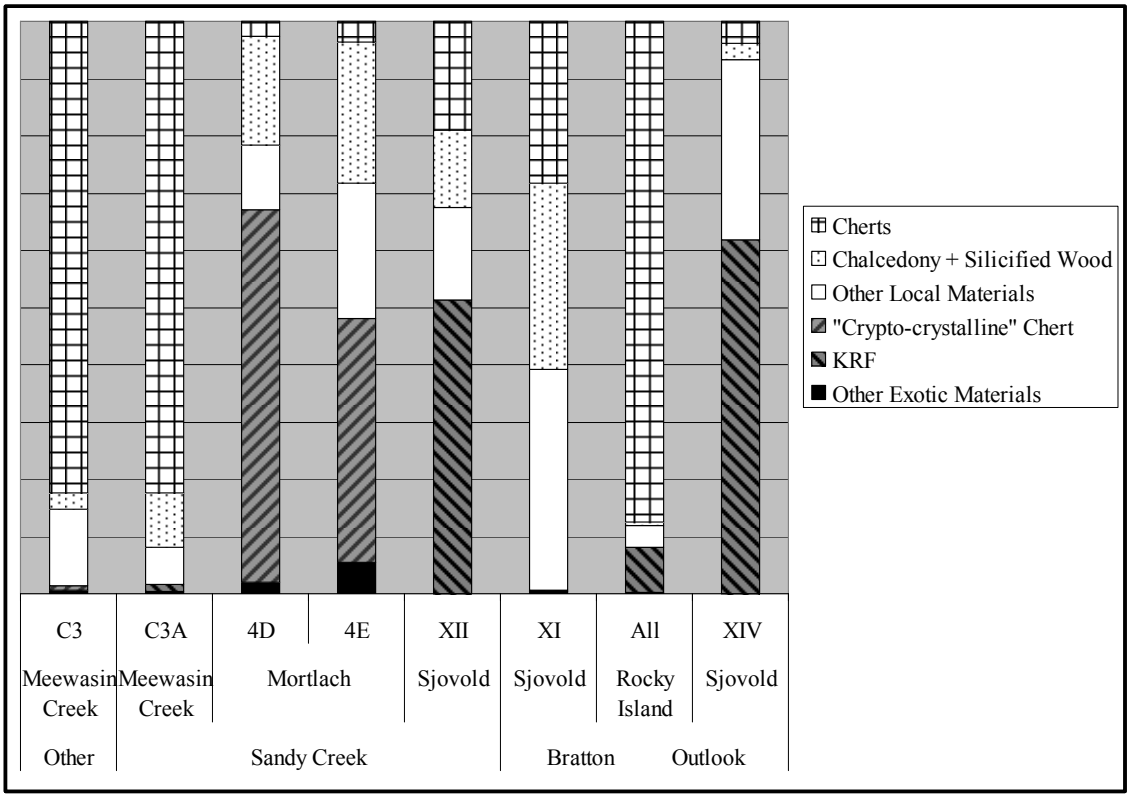

Figure 13.3 Debitage Material Types from Sandy Creek and Comparable Occupations.

The Sandy Creek components are comparable in age as the uncorrected radiocarbon ages of Mortlach layer 4E is 2400 ± 173 B.P. (S-28), Sjovold layer XII is 2450 ± 150 B.P. (S-2059), Walter Felt layer 15b is 2430 ± 90 B.P. (S-279), and Meewasin Creek layer 3A is 2405 ± 50 B.P. (BGS 2740). Dyck (1983) originally classified the culture as spanning from 2450 to 1950 B.P., but the terminal date is based on results from the Cherry Point site in Manitoba (DkMe-10; Haug 1976), the results of which are debatable as the stratigraphy appears to be mixed. Table 13.8 outlines the known radiocarbon dates in the Canadian Archaeological Radiocarbon Database (CARD). The dates indicate a relatively limited time period from the generous range of 3000 to 2250 B.P., or the more discrete range of 2550 to 2300 B.P. (CARD 2009). Based on radiocarbon date histogram analysis, Morlan (1988:306, Figure 6:307) supports the argument for Sandy Creek transitioning into Besant approximately 2350 to 2150 B.P.

Table 13.8 Sandy Creek Radiocarbon Dates from Meewasin Creek and CARD (2009).

Site Name	Borden	Province	Lab No.	Level	Sample Type	Uncalibrated Age B.P.	Calibrated Age B.P.
Bodo	FaOm-22	AB	Beta-209522	70-80 cm dbs	Bone	2430 ±40	2330 ± 40
Cranford	DlPb-2	AB	AECV-475C	-	Charcoal	-	2550 ± 90
Lebret	EeMw-26	SK	S-2796	Area B; Level 6	Charcoal	2495 ± 440	2495 ± 440
Lebret	EeMw-26	SK	S-2791	Area A; Level 4	Bone	2980 ± 105	3060 ± 105
Meewasin Creek*	FbNp-9	SK	BGS 2740	Level 3A	Charcoal	2405 ± 50	2360 ± 50
Mortlach	EcNl-1	SK	S-28	Layer 4E	Organic sediment	2400 ± 173	-
Sjovold	EiNs-4	SK	S-2059	Layer 12	Bone	2355 ± 105	2435 ± 105
Walter Felt	EcNm-8	SK	S-279	Layer 15B	Charcoal	-	2430 ± 90
*This volume; http://www.canadianarchaeology.ca/localc14/c14results.php							

Archaeologists have noted that the Sandy Creek complex is contemporaneous and frequently found in association with Pelican Lake components (Reeves 1983:14; Vickers 1986). Kehoe (1974) includes the Sandy Creek variety in the Pelican Lake series, although more recently most archaeologists define it as early Besant (Vickers 1986, Dyck and Morlan 1995, Cloutier 2004, Varsakis 2006). Although previously proposed as a separate complex (Wettlaufer 1955, Dyck 1983), the observation of a second dart point with a straight base at the Sjovold site led Dyck and Morlan (1995) to refer to

Sandy Creek as a point style within the larger Besant series. In recent decades Sandy Creek has fluctuated in favour as a separate culture and is generally subsumed as part of the greater Besant phase. Archaeologists have proposed that the Sandy Creek Side-notched variety refers to a point style, and that it is one of several within the Besant series (Reeves 1983, Dyck and Morlan 1995, Varsakis 2006).

The origin of Sandy Creek is still unclear. It has been proposed that the Sandy Creek point is a transitional form whereby Oxbow evolves into Besant (Vickers 1994:11, Reeves 1983:14). Despite morphological similarity, chronologically Sandy Creek is distinct from Oxbow, occurring much later on the Northern Plains. This "remnant Oxbow" theory (Gibson 1981) has been proposed, although there is still little evidence to support it. Gibson (1981:133-136) suggests the Oxbow home range may have shifted to the fringes of the prairie and into the parkland and boreal forest regions of Saskatchewan and Alberta due to population pressures. The re-emergence of the point style as Sandy Creek indicates that there was not a complete abandonment of the Plains, as sporadic evidence of use is apparent at Sandy Creek sites in south-central Saskatchewan, river valleys, and sand dune environments. Ultimately, the limited number of Late Oxbow/Sandy Creek sites hinders the ability to connect the evolution of Oxbow into Sandy Creek.

Bratton Comparison

The Bratton point was found at both the Sjovold and Rocky Island sites. The complete jasper point in Level XI (Dyck and Morlan 1995; Figure 15.6.a) appears nearly identical to the yellow chert point found at the Rocky Island site (This volume; Figure 13.1:B). Both have a "sharp" appearance, convex base, acute shoulders, and deep and narrow side notches positioned just above the base. Because both corner notching and side notching can appear on a single specimen, Dyck and Morlan (1995:378-379) suggest, "there is compelling evidence to support the notion that the type is not diagnostic of a particular complex or locality."

Disregarding the point tips, the other projectile points at both Rocky Island and Sjovold Layer XI are dissimilar, implying a variety of point styles were used at the same time. The second convex-based point at Rocky Island has convex sides and less

precisely defined edges which may be because it is un-notched and unfinished. The incomplete petrified peat point in Layer XI of Sjovold is poorly made and has basal grinding. Clearly, the presence of basal grinding is variable.

Features present in the Bratton components of Sjovold and Rocky Island include multiple fire pits, lithic workstations, heating rocks and bone in cooking. Both sites share a similar tool kit with a number of endscrapers, scrapers, cutting tools and bifaces. Assumedly similar activities were taking place. The lithic materials present within both components are fairly comparable as there is an emphasis on a variety of local materials, particularly Swan River chert. However, there is a great deal of Knife River flint at Rocky Island, whereas it is negligible at Sjovold, although there is a preference for petrified peat instead. Quartzite is less significant at Rocky Island than Sjovold.

The faunal assemblage is predominantly bison, although there is evidence of rabbit or hare and raven present at Sjovold. The incomplete analysis of the Rocky Island site limits a more in-depth comparison.

Outlook Comparison

The straight-based point from Rocky Island is similar to the Outlook points in layer XIV of the Sjovold site. The point styles are similar with straight ground bases and low side notches. Six of the ten projectile points at Sjovold are made of Knife River flint, and one each of Swan River chert, silicified sediment, fused shale, and buff-cream chert (Dyck and Morlan 1995:431). The lithic tool assemblage at Sjovold layer XIV is comprised mostly of projectile points. A biface, endscraper, and three edge-modified tools are hardly comparable to the 49 tools at the Rocky Island site. A hammerstone or a hammerstone/anvil was found in both components. Flaked tools at Rocky Island are predominantly made of Swan River chert, although a wide variety of materials are present including Knife River flint, silicified peat, agate, jasper, chert, and two utilized flakes made of obsidian. The three Sjovold tools are made of Knife River flint, silicified sediment and fused shale. The debitage is consistent with tool manufacture as fine quality materials are more often selected, including a high proportion of petrified peat and petrified wood. Exotic materials such as Knife River flint, obsidian, and possibly

chalcedony and agate are present in small quantities. Bone tools were found at Sjovold but not at Rocky Island.

The Rocky Island site appears to contain both Bratton and Outlook points in what is assumed to be a single occupation component. At the Sjovold site the two point styles are separated by a Sandy Creek occupation (Layer XII) and an unknown and undated occupation (Layer XIII). However, it is remarkable how the radiocarbon ages obtained for all three layers occur within a relatively short time frame. The Rocky Island component with an uncorrected radiocarbon age of 2475 ± 120 B.P. (S-2437) is comparable to the Outlook component at Sjovold with an uncorrected radiocarbon age of 2500 ± 85 B.P. (S-2060), the Sandy Creek uncorrected age of 2355 ± 105 B.P. (S-2059) and the Bratton uncorrected age of 2505 ± 90 B.P. (S-2058). The margin of error on the Sjovold layers XIV through XI indicates that the site was revisited within a matter of decades, if not years. Certainly, the site could have been revisited within one to three generations.

In his analysis of the Fitzgerald site (ElNp-8), Hjermstad (1996) determined that the separation of Besant Side-notched points is unwarranted. He concludes:

> There are no patterns in the use of Outlook and Bratton projectile points over space and time. The two point styles were both identified in sites from Wyoming (Ruby) to Manitoba (Richards), in contexts ranging in age from 2500 BP (Happy Valley) to 1200 BP (Antonsen), and in assemblages dominated by both Knife River flint (Fitzgerald) and by local materials (Happy Valley), Coupled with the reasons from the Sjovold site excavations (Dyck and Morlan 1995), it would seem that these Bratton and Outlook points overlap both temporally and spatially for a period of at least 1300 years (Hjermstad 1996: 97-98).

Evidently a number of occupations are noted within the localized area of central Saskatchewan after about 2500 years ago. People utilized stylistically different point types with characteristics similar to both Pelican Lake and Besant. Possible explanations for this will be discussed below.

13.3 Developing the Chronological Framework

After reviewing the Terminal Middle Precontact sites and comparing sites within close proximity in both time and space approximately 2500 years ago, it is clear there are several different cultural expressions evident on the Northern Plains represented by at least five distinct projectile point varieties: (1) corner-notched points with a straight base (Pelican Lake), (2) corner-notched points with a convex base (Pelican Lake), and side-notched points with either (3) concave base (Sandy Creek), (4) straight base (Outlook), and (5) convex base (Bratton). It has been observed that corner-notches and side-notches have been noted on the same specimen, so clearly notch type is not always a critical defining factor. Figure 13.2 illustrates a number of projectile point forms evident and places them within a chronological framework. It is the relationship among these points with their associated cultural affiliation that needs to be re-evaluated.

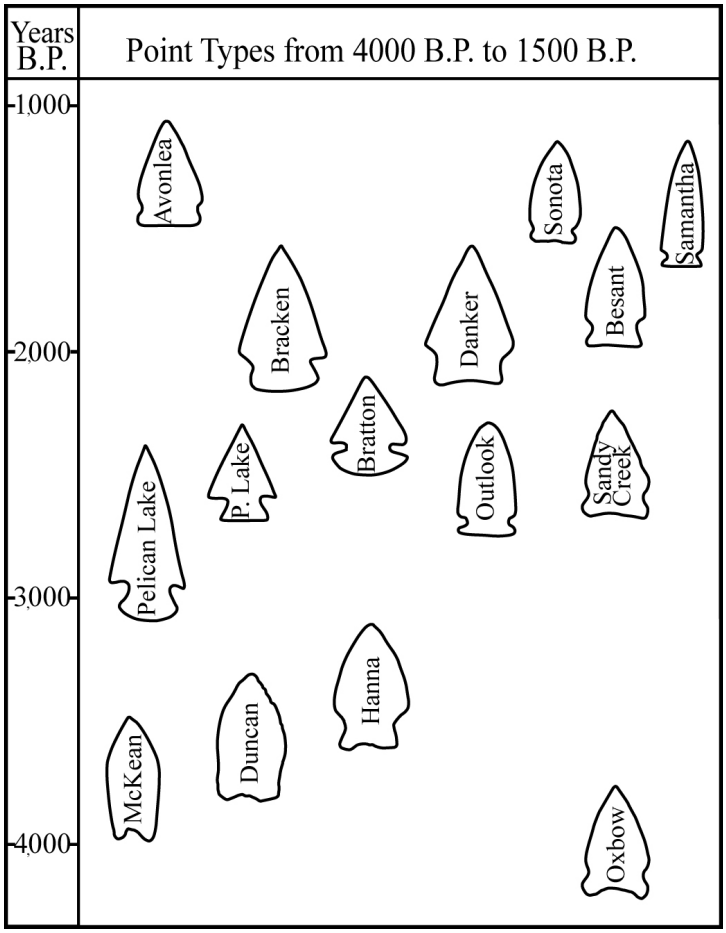

Figure 13.4 Projectile Points on the Northern Plains 4000 B.P. to 1500 B.P. (Points not to scale.)

Questions arise as to why there are several varieties of point styles within a short period of time. These can be explained by two hypotheses. Either the points represent technological variations relating to different tool use and hunting strategies, or the points reflect varied cultural expressions of multiple populations living on the Northern Plains. These hypotheses are not mutually exclusive, but each will be discussed in turn in the following pages.

13.3.1 Hypothesis 1: Technological Variations

It is hypothesized that the varied projectile point styles within the study period represent different lithic technologies for different hunting techniques or changing subsistence strategies.

Most researchers agree that the bow and arrow was in use on the Plains by 1750 B.P. at the latest with the widespread presence of the quintessential arrowhead, the Avonlea projectile point (Kehoe 1973:77, Dyck 1983:122). The Samantha point is considered the Besant adaptation to the bow and arrow (Kehoe 1974). Some researchers have proposed that versions of the bow and arrow technology may have appeared earlier, but may not have been adopted by all plains groups and did not become widespread until it was perfected in later models (Dyck and Morlan 1995).

Kehoe (1974:104) explains the shift in point style from the Large Corner-notched Point System (atlatl dart points) to the Small Side-notched Point System (bow and arrow) as a result of changing techniques from hunting at a distance to utilizing a corral:

> Large heavy points give accuracy and good impact over a greater distance. The corner-notching, shoulders, and barbing all worked toward the retention of the shaft in running animals… The entanglement of the shaft in the underbrush would enlarge the wound, resulting in … ultimate death of the animal, whose blood trail could be easily followed… It is suggested that the sharply barbed points (Pelican Lake) could have changed into the shouldered points (Sandy Creek and Besant) in subsequent Plains bison hunting when retention of the shaft became unnecessary."

In contrast, the small side-notched point system, including Plains and Prairie Side-notched forms, "are superior in dispatching bison at close range afforded by corrals" (Kehoe and McCorquodale, 1961:187). Kehoe (1974) does not account for the use of corrals and jumps by the Besant, who were "masters of the pound hunting technique" (Dyck 1983:113).

Sandy Creek and most Middle Precontact points are generally believed to be dart points based on age and size, however, some points such as Bratton and Outlook points may represent the addition of different technologies. Straight based points have been associated with early arrowhead-sized points. Dyck (1983) hypothesizes that Pelican Lake people utilized early bow and arrow technology, but it may have been technologically inferior for many centuries and was not adopted by other groups until it was perfected many centuries later.

Dyck and Morlan's (1995) analysis at the Sjovold site included applying the Thomas (1978) discriminant classification equations to determine whether a point was a dart or an arrowhead. Bratton points in Layer XI were determined to be arrow points and the Sandy Creek point in Layer XII is a dart point (Dyck and Morlan 1995:378, 397). Within Layer XIV, considered an Outlook occupation, five of the seven points analyzed are determined to be arrowheads, greatly increasing the age of bow and arrow use on the plains (Dyck and Morlan 1995:436). Dyck and Morlan (1995:518,531) concluded that early Pelican Lake and possibly Hanna points were also arrowheads, extending the use of the bow and arrow to 3600 years ago, or raises questions as to the validity of the test. Despite Thomas' (1978) confidence in discriminant analysis for distinguishing atlatl darts from arrowheads, multiple theoretical and experimental tests have determined "small points can serve on atlatl darts and large points will sometimes work on arrows" (Thomas 1978:466). Thomas' (1978) discrimination equation is based on a small number of complete darts and arrows from across North America and any application to an archaeological site must be considered cautiously.

Additionally, it is important to consider that the same group of people may have produced multiple point styles or technologies depending on the hunting or warring activity. The size and shape of the projectile point may directly relate to the intended quarry, or the tool type, whether dart, spear, or bow and arrow, each of which may be

made and carried by the same person (Pyszczyk 2003:53). Archaeologists have noted the bias toward equating individual point styles with different cultural groups (Vickers 1986:112). In fact, it is reasonable to assume there may be several point styles in an individual's tool kit depending on hunting strategies and personal preference.

The presence of small corner-notched points at the Naze site in North Dakota where previously Besant and Sonota points have only been in association with Woodland points indicates that there may have been a more varied tool kit in use where both small and large dart points "may represent the use of light fast darts as well as slower high impact darts, each having different applications in atlatl weaponry systems" (Gregg 1990:35). The large Sandy Creek point from Sjovold layer XII is large for a dart, but may represent a spear or hafted knife instead. Similarly, the Sandy Creek point from Level C3 at Meewasin Creek is asymmetrical, suggesting it was reworked as a cutting tool. The "Oxbow knives" found throughout Oxbow and McKean occupations (Ramsay 1993:360) and in layer C5B at Meewasin Creek represent the use of a varied tool kit throughout the Middle Precontact.

13.3.2 Hypothesis 2: Florescence of Cultures on the Northern Plains

Archaeologists have traditionally sought to explain the evolution of culture change on the Northern Plains in a *linear* format. It is more likely, however, that there are more than simply two or three traditions. At the 2500 B.P. time frame the Pelican Lake complex is evident on the Northern Plains in occupations spanning several centuries. During the same period Besant complex occupations were establishing on the Northern Plains or surrounding area in order for a quite different cultural expression to be evident by at least 2000 B.P. As discussed above, Sandy Creek, Outlook, Bratton and other points are also evident in the archaeological record by this time. Early ethnographic reports indicate a number of Plains tribes living and traveling on the plains adapted to a mobile lifestyle. It is reasonable to assume that during the study period there were also several coeval cultural traditions with varying backgrounds adapted to a similar lifestyle, with diagnostically distinct weaponry. Admittedly, it is difficult to recognize ethnicity in the archaeological assemblage, but by looking at more than point styles there can be a

more holistic approach to understanding the transition of the complexes, and recognizing a distinct local assemblage.

The environmental conditions by 2500 B.P. were transitional, fluctuating from a cool, moist period toward a warmer more modern environment (Scuderi 2002). Geologically, Meewasin Creek site, Mortlach and Sjovold all show evidence of increased flooding activity below the Sandy Creek occupations (pre-2400 B.P.). The Classic Pelican Lake occupations coincided with a series of sandy episodes whereby little soil development occurs before the next flood. This series of flood and stability is evident at Meewasin Creek below Level 3. Sedimentary deposits correspond to known drought episodes during which little vegetation would have grown and any rain would have caused major flooding. Rutherford's (2004) sedimentary analysis of Wanuskewin Heritage Park indicates that there is more slope stability after 2000 years ago as there are moister conditions and increased vegetation cover. Moister conditions after the Altithermal led to an increased carrying capacity on the Plains, and thus, human population increased as bison and other flora and fauna flourished (Reeves 1983). Syms (1977:129) noted that there was an increase of Early Woodland sites 2500 to 1550 B.P. It is reasonable to assume if Woodland people travelled as far as Manitoba, they could also have reached Saskatchewan, or displaced people toward Saskatchewan. The moderate conditions made the Plains more attractive than regions in peripheral areas suffering from overpopulation pressures such as the Black Hills (Hannus 1994:182) and Eastern Woodlands (Syms 1977).

The culture history of the Northern Plains has been debated and modified by many researchers (Brumley and Dau 1988, Walker 1992, Vickers 1994, among others). (See Chapter 3.) Reeves (1970[1983]) developed the Napikwan and Tunaxa traditions to explain the culture history of the extant cultures at the time of European contact. The Blackfoot were traced back through the Old Women's, Besant, and Sandy Creek phases through the Napikwan tradition (Reeves 1983). The Tunaxa tradition accounts for the Kootenay people (K'Tunaxa) that can be traced back through Plains Side-notched, Avonlea, and the Pelican Lake cultures (Reeves 1983). Reeves (1983:185-192) proposed that the Besant phase of the Napikwan cultural tradition resided on the northeastern

periphery of the Plains since approximately 2500 B.P., when the population expanded westward throughout the Northern Plains, displacing the indigenous Tunaxa population.

Alternatively, Hannus (1994) describes the Plains Archaic tradition which extends from Oxbow through McKean, Duncan-Hanna, Yonkee, Pelican Lake, Sandy Creek and Besant. A separate cultural influence on the Plains associated with the Sonota complex from the Eastern Woodland tradition extends from Manitoba through to Alberta and the Dakotas.

Regardless of these models, evidence for Pelican Lake occupations are predominantly earlier in the western slopes of the Rocky Mountains and extend eastward onto the plains over time (Reeves 1983). Archaeological evidence strongly suggests that Besant originates from the southeast as Besant points are found in Plains Woodland sites in North and South Dakota (Johnson and Johnson 1998:218). During Besant times there were definite communication and trade links between the Northern Plains and both the Eastern Woodlands and the Middle Missouri area, but the resulting social influences of this contact are not clearly understood (Vickers 1994:14).

Conversely, one perspective is that Besant originates from the north. Byrne (1973:466) suggests that Besant represented the movement of non-pottery using people who came from the northern boreal forest into Manitoba and then subsequently expanded south and west. Based on linguistic studies, Schlesier (1994:318-319) proposes that Besant originated from the north as Shield Archaic peoples speaking Proto-Algonquian migrated from the Northwest Territories approximately 3500 to 3000 B.P. due to deteriorating climate and pressures from advancing Pre-Dorset Eskimo groups who were following the expanding tundra south. Conflicting origins for Besant indicate that there were many influences evident in the archaeological record during the early Besant time period.

Syms (1977) and Reeves (1983) claims the success and expansion of the Besant were due to the Hopewellian Interaction Sphere, which is based on a shared set of social status items and exotic unburned materials centered in the Illinois and Middle Missouri area. The interaction sphere lead to a more advanced, ranked social organization, and improved communication and trade networks as evidenced by the high percentage of Knife River flint in many Besant sites as well as exotic grave goods. Current evidence

does not support the notion that a Hopewellian Interaction Sphere provided a great influence on the Plains as Sonota burial mounds are recognized as unranked and Knife River flint is rare in Hopewellian sites, while obsidian is rare in Besant sites (Neuman 1975:85,91, Vickers 1986:86-87, 1994:14). However, there may still be a general Plains influence and the quantity of Knife River flint may hold the key.

Despite conflicting views about the origin of the first people to utilize Besant points, the characteristic Besant-Sonota expression was well established across the Plains by at least 2000 years ago (Reeves 1983, Neuman 1975, Syms 1977, Vickers 1984, Gregg 1994, Hannus 1994:184). The Besant-Sonota complex clearly has definite ties to North Dakota as certain bison jumps and pounds contain high quantities of Knife River flint. At some sites such as the Mulbach site (Gruhn 1971) in Alberta and the Melhagen site (Ramsay 1991) in Saskatchewan, Knife River flint is used for the manufacture of 70 to 90 percent of all artifacts. This suggests the that the groups had recently been in North Dakota, and may represent people moving seasonally from the quarry area to hunt bison on the Alberta and Saskatchewan Plains (Vickers 1994:13). Dyck and Morlan (1995) propose the high levels (60%) of Knife River flint in level XIV at the Sjovold site falls into this category. Migration patterns can be tracked as increased exotic material at sites may reflect the distance and time spent since people had access to quarry material.

More recently, Varsakis (2006) claims Sonota is a separate sub-phase within Besant with ties to the Dakotas and farther southeast encompassing a separate cultural group expressed in Besant sites that have a high percentage of Knife River flint. The Fincastle kill site (DlOx-5) near Lethbridge contains a number of points demonstrating early Besant-Sonota point styles circa 2500 B.P. (Varsakis 2006).

A number of conditions combined resulted in an increasingly complex trade networks, evidenced by the presence of obsidian, Knife River flint, and cherts and jasper from Montana and Wyoming. Lithic materials provide strong evidence that people had well-established trade networks or strong ties throughout the Northern Plains.

Reeves (1990:169-170) interprets the florescence of culture beginning approximately 3000 years ago due to the development of pemmican and the bow and arrow. Pemmican, a nutritious and portable food source comprised of ground and mixed dried meat, berries, and bone grease enabled greater mobility and food preservation. Evidence for pemmican

production is visible in the archaeological record by the appearance of high quantities of fire-cracked rock and broken bones. Such evidence has been noted in early Middle Precontact sites such as Gowen (Walker 1992), which debatably may or may not represent bone grease production (Morlan 1994; see also Hjermstad 1996:258-259).

With the influences from many directions, it is the region in the middle of the Northern Plains where a convergence of ideas and people are evident at Meewasin Creek and similar sites. Projectile points and distinct assemblages represent the emergence of distinct cultural groups. Further research is needed as more sites are excavated.

Chapter 14
Summary and Conclusions

14.1 Summary of Meewasin Creek Site

The research presented in this thesis describes the archaeological analysis of the Meewasin Creek site with the intent to gain a greater understanding of the culture history of the Northern Plains and develop a clearer model of the Terminal Middle Precontact period. The Meewasin Creek site is a complex, multicomponent site in one of the most concentrated archaeological regions in the Northern Plains. This thesis complements and adds to the knowledge of Wanuskewin Heritage Park and the people who lived in the Saskatoon region for millennia.

The Meewasin Creek site was first located in 1982 and initial testing began that summer (Walker 1983a). The research included in this thesis is based on the University of Saskatchewan Department of Archaeology and Anthropology field school excavations during the summers of 1999, 2000, 2001, and 2003. Excavation of the Meewasin Creek site has revealed a series of cultural occupations extending over the past 4000 years. Detailed analysis of the lithic artifacts, faunal remains, pottery, floral remains and features from each occupation was undertaken in order to gain a better understanding of how the site was used and how site use changed over time. The results of the analyzed artifacts and ecofacts and their correlation with noted features were carefully described in as much detail as possible to provide a greater understanding of the processes of the past within limited time and financial constraints. The geoarchaeological studies by Rutherford (2004) at Meewasin Creek and Burt (1997) within the Wanuskewin Heritage Park complement the geomorphological understanding of the site formation processes. Background research regarding the cultural, environmental and geological history of the area was presented in order to provide a greater understanding of the significance of the site within the greater Northern Plains dynamic.

The cultural affiliation can be interpreted in several of the levels by the presence of diagnostic artifacts and radiocarbon dated ecofacts. Figure 14.1 outlines the proposed cultural affiliation and progression of known occupations at the Meewasin Creek site with associated radiocarbon ages.

Table 14.1. Chronology of Meewasin Creek (FbNp-9) with Diagnostics.

Cultural Level	Cultural Affiliation	Diagnostic Artifact/ Ecofact Type	2 Sigma Cal. RC Age Range	Cultural Date Ranges
C1	Proto-historic/ Historic	Dominion Cartridge Company .22 cal. shell	–	(after A.D. 1900) 50 B.P. – present
C2	Avonlea	Rock Lake Net–Impressed Pottery Sherd	–	1800 – 900 B.P.
		Avonlea Plainware Pottery Sherd	–	1800 – 900 B.P.
		Bone (BSG 2742)	1817 – 1542 B.P.	–
C3	Un–Named/ Outlook Complex	Projectile Point	–	*c.* 2500 – 2000 B.P.
		Bone (S–2366)	2365 – 1814 B.P.	–
C3A	Sandy Creek	Projectile Point	–	2450 – 1950 B.P.
		Charcoal (BSG–2740)	2711 – 2339 B.P.	–
C4A	Pelican Lake	Projectile Point	–	3300 – 1850 B.P.
C4B	–	Bone (BSG–2743)	2433 – 2123 B.P.	–
C5A	–	Charcoal (BSG–2741)	4437 – 3731 B.P.	–
C5B	Duncan	Projectile Point	–	4150 – 3100 B.P.
C6	Unknown Precontact	–	–	–
C7	Unknown Precontact	–	–	–

Cultural Level 1 represents the accumulated remains of a small bison kill site and more recent detritus deposited since the Saskatoon region was settled. A stone circle visible on the surface to the east is believed to represent a habitation associated with the occupation level. Artifacts of note include a single pottery shard, a quartz biface, occasional expedient tools, as well as hammerstones and chipping debris reflecting tool rejuvenation activities. A significant amount of coarse cobbles were found throughout the level, some of which showed signs of heating. The faunal remains include at least six bison, a canid, cervid, snowshoe hare and four small rodents. A small amount of burning occurred on the bones as well as blunt trauma. The remains of a mature lynx were recovered from the test pits within the centre of the excavation block, although no cultural marks were noted. No chronologically diagnostic materials were recovered, nor was a determination of seasonality possible.

Cultural Level 2 contains evidence of a larger-scale bison kill site and processing area due to the high volume of bison bone remains representing at least ten individuals. Although it has been proposed that a pound was in use, no direct evidence for a pound structure was evident aside from numerous cobbles scattered through the levels and a concentrated cobble feature. The pound structure, if utilized, may have been located beyond the extent of the excavation block. Two hearths were noted and a fair amount of coarse rock and FCR scattered throughout the level. The only diagnostic artifacts were the presence of two pottery sherds, Avonlea Plainware and Rock Lake Net-impressed Ware. A grooved maul portion correlates with the extensive butchering and bone crushing, indicating possible marrow extraction for the production of pemmican. Limited stone tool manufacture and rejuvenation is present in the form of a few expedient cutting tools and chipping debris. A composite bone sample obtained a calibrated radiocarbon age of 1660 cal B.P. (BSG 2742), which is tentatively attributed to this level.

Cultural Level 3 is interpreted as a small scale bison kill site and processing area. A bone sample obtained a calibrated radiocarbon age of 2090 ± 275 B.P. (S-2366). Three possible projectile points were recovered, with little clarity as to the cultural affiliation. One has both corner and side notches, and resembles the Un-named complex points, the second point is un-notched, triangular, and possibly a preform, and the third point is only a mid-shaft. Lithic debitage is consistent with tool manufacture, and resharpening activities with the associated early stage bison processing areas. The remains of least four bison were recovered, with evidence of butchering and cut marks present. Lithic material is largely from local sources, although some tools made from more exotic materials were in use, if not discarded. Canid and rodent specimens were present. Three pottery sherds were recovered, but were too small to determine a cultural affiliation more specific than Late Precontact.

Cultural Level 3A is a partially eroded, discontinuous level that extends only across the eastern units excavated. A Sandy Creek point was recovered near a concentration of cobbles and other stone tools. The point correlates with a radiocarbon age obtained from charcoal 2405 ± 45 B.P. (2360 cal B.P.; BSG 2740). The majority of lithic debitage is comprised of Swan River chert and various other cherts, and the few pieces of exotic

debitage are generally small tertiary flakes deposited as the result of reworking tools. Activities suggest the occupation was a short-term campsite with cooking and late stage bison processing activities occurring. A grinding stone was possibly used for plant or meat pulverizing.

Cultural Level 4 is composed of at least two occupations that are compressed in the westernmost units, and gradually more separated by slope wash sediment towards the easternmost units. The shallower Pelican Lake occupation (Level 4A) contains a number of lithic tools and chipping debris. Although Level 4A was not been chronometrically dated, Level C4B has an uncorrected radiocarbon date of 2286 ± 70 B.P. (2340 ± 70 cal B.P.; BSG 2743). This date fits well as a Pelican Lake occupation and although earlier than the date from Level 3A, it is within the margin of error. The assay is late for a McKean occupation which suggests that the buried soil in at least the western portion of the site may have been stable and exposed to other visitors for a long period of time. Level 4B contained more bison remains than Level 4A, yet each occupation has an MNI of one. Hearths were present in both levels as was a heavy concentration of chipping debris and flaked tools diagnostic of activities pertaining to a habitation with middle to late stage bison processing activities. Based on foetal bone present, seasonality was determined in Level 4A as a winter camp with associated bison processing activities.

Cultural Level 5 follows a similar geomorphological pattern as Level 4 (A and B) as the level separates into two occupation levels in the eastern units. More endscrapers are noted in these levels that have been worn down until discarded as useless. A well made hafted biface was present in C5B, which are commonly found in both McKean and Oxbow complex components. Cores and debitage suggest tool manufacture and re-working. Few faunal remains were recovered from Level 5B, and even less from Level 5A. Only enamel from C5A, although enough charcoal was recovered to obtain a radiocarbon date 4120 ± 120 calibrated years B.P. (BSG 2741). This date correlates with the Duncan point found in Level 5B. A dark organic stain noted in Level C5A and associated scrapers and cutting tools indicates a hide-working activity area. A hearth in Level C5B has burned and calcined bone, FCR and debitage associated.

Cultural Levels 6 and 7 are ephemeral occupations poorly represented and rarely excavated to a depth deep enough to reach. Level 6 contains the remains of a right distal

fore-limb of a bison, and a few scattered bone fragments, presumably bison. Level 7 is represented as a single biface within a small buried soil lens less than a metre wide. No diagnostic artifacts or chronometric ages were obtained for either Level C6 or Level C7.

In the deeper levels (C3A, C4 and C5) activities were dominated by lithic tool manufacture and rejuvenation, whereas the upper levels (C1, C2, and C3) contained denser bone beds and fewer lithic materials. The majority of activities are carried out in the eastern half of the excavation determined by the presence of hearths and a higher density of discarded tools, lithic debitage, and faunal debris. This higher density correlates with a more gently sloping living floor formed by the initial erosion of the gully followed by slope wash depositing sediment within the basin. The slightly steeper sloped western area may reflect discard areas in several levels.

14.2 Summary of Terminal Middle Precontact

Research has shown that there are a number of cultures present during the Terminal Middle Precontact period. Projectile point variations represent diverse cultural expressions of multiple populations with varying technology. Pelican Lake, Sandy Creek and Besant sites with assemblages dominated by local lithics likely represent occupations by local Plains adapted groups. Because so few Sandy Creek sites have been found within an archaeological context, the Sandy Creek point recovered in Level 3A stimulated a discussion in Chapter 13 about the relationship between Terminal Middle Precontact cultures. Both Sandy Creek and Outlook were first placed within the Pelican Lake series, but more recently both have been considered as early Besant (Dyck and Morlan 1995). Despite the high percentage of Knife River flint material comprising the Outlook points, the term Outlook remains as a point style denoting the Sjovold and Rocky Island points with narrow low notches and straight bases from other side-notched Besant classifications. A comparison of the stratified Mortlach, Sjovold, and Walter Felt sites, as well as the single component Rocky Island site provided a contextual pattern for the processes of cultural change visible in the Northern Plains.

The sedimentary deposition at Meewasin Creek is similar to Mortlach, Sjovold, and Walter Felt sites, and shows a similar progression of occupations from Duncan or other McKean series in the deeper levels, through Pelican Lake, Outlook, Sandy Creek,

Besant, and other Late Precontact occupations towards the surface. Radiocarbon dates show that there were a number of cultures evident in the Northern Plains by approximately 2500 years ago, which were perceived to be different based on projectile point variation, lithic material preference, and tool variation.

The Meewasin Creek stratigraphy corresponds with known climatic changes from a drier environment during the Altithermal, towards a moister, cooler environment that was conducive to support more vegetation and thus larger herds of bison on the Plains. This greater carrying capacity resulted in a human population increase which is evident in the increased number of sites during this time period, and a greater variety of projectile points. Although the cultural dynamics are still unclear, there may be influences from the Middle Missouri, the Black Hills, the Eastern Woodlands, and possibly from the north.

Despite the evidence for the presence of trade networks with exotic lithics, there is still a strong dependence on local material, particularly noted at Meewasin Creek. The Sandy Creek component at Meewasin Creek (C3A) contains significantly less exotic lithic material than other Sandy Creek and Besant occupations noted elsewhere on the Northern Plains. This trend is consistent with some other Besant occupations, however, and reflects the varied preference for material dependent upon accessibility, trade networks, and proximity to source (physically, or temporally).

This period also corresponds with technological changes where the early prototypes for the bow and arrow may have been in use, but whether or not it was perfected and in widespread use is still undetermined.

The environment, an influx of people and ethnicities, and changing technology may have each played a role independently or cohesively in this apparent florescence of culture.

14.3 Future Directions

This study has highlighted a number of areas where future study is warranted. Due to multiple constraints, less than one percent of the potential occupation area within the natural basin has been excavated. An expansion of the excavation block eastward toward the river and the surrounding units may uncover further separation of the occupation

levels. The deeper levels (C3A through C5B contained a higher density of artifacts and features in the easternmost units. Additional excavation may uncover more intensely used activity areas and may prove to be valuable in obtaining additional knowledge about Middle Precontact habitation including Pelican Lake and Duncan culture history within the Northern Plains. No evidence of a pound structure was determined, despite the high volume of bison bone in Cultural Level 2 and the natural topography that is ideal for running bison down a hillslope. The location of a corral structure, if present, may be farther east.

An increase in excavated area would increase the opportunity for finding diagnostic materials. Of particular interest are levels that did not reveal any diagnostic specimens, and Cultural Level 3A, which contained only the single Sandy Creek point. Additional diagnostic projectile points may clarify the relationship between Terminal Middle Precontact components. Additional potsherds may relate the Meewasin Creek site to other Late Precontact components.

The stone circle on the surface underwent merely test excavations. As more research is being done on low artifact volume sites there may be more that can be determined both within and immediately surrounding the stone circle.

The soil samples collected from the site during the 2003 excavation have not been analyzed to any great detail. Additional soil analysis such as flotation may reveal more floral remains than what has been recovered as of yet and indicate which local vegetative resources were accessed.

The continued search for Sandy Creek and contemporaneous components at Wanuskewin Heritage Park and elsewhere on the Northern Plains will provide more refined understanding of the dynamics among Terminal Middle Precontact relationships.

References Cited

Acton, D.F., G.A. Padbury, and C.T. Stushnoff
1998 *The Ecoregions of Saskatchewan*. Canadian Plains Research Centre/ Saskatchewan Environment and Resource Management, Regina.

Amundson, L. J.
1986 *The Amisk Site: A Multi-Component Campsite in South-Central Saskatchewan*. Unpublished Master's thesis, Department of Archaeology and Anthropology, University of Saskatchewan, Saskatoon.

Banfield, A. W. F.
1974 *The Mammals of Canada*. University of Toronto Press, Toronto.

Brandon, J. J.
1989 *The Artifacts and Stratigraphy of the Letendre Complex, Batoche, Sask*. Unpublished Master's thesis, Department of Archaeology and Anthropology, University of Saskatchewan, Saskatoon.

Brumley, J. and B. Dau
1988 *Historical Investigations Within The Forty Mile Coulee Reservoir*. Manuscript Series No. 13. Archaeological Society of Alberta, Edmonton.

Burt, A. K.
1997 *Landscape Evolution at Wanuskewin Heritage Park, Saskatoon Saskatchewan*. Unpublished Master's thesis, Department of Geography, University of Saskatchewan, Saskatoon.

Byrne, W.
1973 *The Archaeology and Prehistory of Southern Alberta as Reflected by Ceramics*. Archaeological Survey of Canada Mercury Series Paper No. 14 Vol. 1-3, National Museum of Man, Ottawa.

CARD
2009 Canadian Archaeological Radiocarbon Database (CARD). (Consulted April, 2009: http://canadianarchaeology.ca/)

Christenson, A.L.
1997 Side-Notched and Unnotched Arrowpoints: Assessing Functional Differences. In *Projectile Technology*, edited by H. Knecht, pp.131-142. Interdisciplinary Contributions to Archaeology Series xviii. Plenum Press, New York.

Cloutier, R.
2004 *Testing Contemporaneity: The Avonlea and Besant Complexes on the Northern Plains*. Unpublished Master's thesis, University of Saskatchewan, Saskatoon.

Corbeil, M.R.
1995 *The Archaeology and Taphonomy of the Heron Eden Site, Southwestern Saskatchewan*. Unpublished Master's thesis, University of Saskatchewan, Saskatoon.

Cyr, T. J.
2006 *The Dog Child Site (FbNp-24): A 5500 Year-Old Multicomponent Site on the Northern Plains*. Unpublished Master's thesis, University of Saskatchewan, Saskatoon.

Dawe, B.
1997 Tiny Arrowheads: Toys in the Toolkit. *Plains Anthropologist*. 42(161):303-318.

Dyck, I.
1983 The Prehistory of Southern Saskatchewan. In *Tracking Ancient Hunters*, edited by H. T. Epp and I. Dyck, pp. 63-139. Saskatchewan Archaeological Society, Regina.

Dyck, I. and R.E. Morlan
1995 *The Sjovold Site: A River Crossing in the Northern Plains*. Mercury Series, No. 151. Archaeological Survey of Canada, National Museum of Man, Hull.

Epp, H. T.
1991 *Long Ago Today: The Story of Saskatchewan's Earliest Peoples*. Saskatchewan Archaeological Society, Saskatoon.

Friend-Heath, R.
1995 *The Rocky Island Site: A Report*. Permit No. 95-46. Report on file at the Heritage Resources Branch, Ministry of Tourism, Parks, Culture and Sport, Regina.

Frison, G. C.
1971 The Buffalo Pound in North-Western Plains Prehistory: Site 48CA302, Wyoming. *American Antiquity* 36:77-91.

1978 *Prehistoric Hunters of the High Plains*. Academic Press, New York.

Fung, K. (editor)
1999 *Atlas of Saskatchewan*. 2nd ed. University of Saskatchewan, Saskatoon.

Gibson, T. H.
1981 Remnant Oxbow on the Northern Plains: The Evidence and its Implications for Regional Prehistory. *Canadian Journal of Archaeology* 5:131-136

Grayson, D. K.
1984 *Quantitative Zooarchaeology: Topics in the Analysis of Archaeological Faunas*. Studies in Archaeological Science. Academic Press, Orlando.

Gregg, M. L.
1990 An Early Plains Woodland Structure in the Northeastern Plains. *Plains Anthropologist* 35(127):29-44

1994 Archaeological Complexes of the Northern Plains and Prairie-Woodland Border. In *Plains Indians, A.D. 500-1500: The Archaeological Past of Historic Groups*, edited by K. H. Schlesier, pp.71-95. University of Oklahoma Press, Norman.

Gruhn, R.
1971 Preliminary Report on the Muhlbach Site; A Besant Bison Trap in Central Alberta. In *Contributions to Anthropology VII: Archaoelogy and Physical Anthropology*. National Museum of Man Bulletin 232:128-156. National Museums of Canada, Ottawa.

Hannus, L. A.
1994 The Black Hills and Beyond. In *Plains Indians, A.D. 500-1500: The Archaeological Past of Historic Groups*, edited by K. H. Schlesier, pp.184-192. University of Oklahoma Press, Norman.

Haug, J. K.
1976 *The 1974-1975 Excavations at the Cherry Point Site (DkMe-10): A Stratified Archaic Site in Southwest Manitoba*. Papers in Manitoba Archaeology, Final Report No. 1. Department of Cultural Affairs and Historical Resources, Winnipeg.

Hjermstad, B. E.
1996 *The Fitzgerald Site: A Besant Pound and Processing Area on the Northern Plains*. Unpublished Master's thesis, University of Saskatchewan, Saskatoon.

Johnson, A.M. and A.E. Johnson
1998 The Plains Woodland. In *Archaeology on the Great Plains*, edited by W.R. Wood, pp. 201-234. University Press of Kansas, Lawrence.

Johnson, E.A.
1998 Properties and Sources of Some Saskatchewan Lithic Materials of Archaeological Significance. *Saskatchewan Archaeology*: *The Journal of the Saskatchewan Archaeological Society* Vol. 19.

Kehoe, T. F.
1966 The Small Side-Notched Point System of the Northern Plains. *American Antiquity* 31:827-841

1967 The Boarding School Bison Drive Site. *Plains Anthropologist* Memoir 4.

1973 *The Gull Lake Site: A Prehistoric Bison Drive Site in Southwestern Saskatchewan*. Publications in Anthropology and History No. 1. Milwaukee Public Museum, Milwaukee.

1974 The Large Corner-notched Point System of the Northern Plains and Adjacent Woodlands. In *Aspects of Upper Great Lakes Anthropology: Papers in Honor of Lloyd A. Wilford*, edited by Elden Johnson, pp. 103-114. Minnesota Historical Society, St. Paul.

Kehoe, T. F and B. A. McCorquodale
1961 Avonlea Point-Horizon Marker for the Northwestern Plains. *Plains Anthropologist* 6:179-188.

Kooyman, B. P.
2000 *Understanding Stone Tools and Archaeological Sites*. University of Calgary Press, Calgary.

Linnamae, U., E. G. Walker, and D. L. Kelly
1988 A Summary of the Archaeology of the Saskatoon Area. In *Out of the Past*, edited by Urve Linnamae and Tim E. H. Jones, pp. 155-171. Saskatoon Archaeological Society, Saskatoon.

Lundqvist, O.
1999 Climate. In *Atlas of Saskatchewan*. 2nd ed., edited by K. Fung, pp.118-119. University of Saskatchewan, Saskatoon.

Lyman, R. L.
1994 *Vertebrate Taphonomy*. Cambridge Manuals in Archaeology. Cambridge University Press, Cambridge.

Mack, L.
2000 *The Thundercloud Site (FbNp-25): An Analysis of a Multicomponent Northern Plains Site and the Role of Geoarchaeology in Site Interpretation*. Unpublished Master's thesis, Department of Archaeology and Anthropology, University of Saskatchewan, Saskatoon.

Malainey, M.
1991 Internal and External Relationships of Saskatchewan Plains Pottery Assemblages: Circa A.D. 1300 to Contact. Unpublished Master's thesis, Department of Archaeology and Anthropology, University of Saskatchewan, Saskatoon.

Manarey, R. B.
1973 *Handbook of Identification Marks on Canadian Arms*. Century Press, Edmonton.

Meyer, D.
1985 A Composite of the Scottsbluff Tradition: Excavations at the Niska Site. *Canadian Journal of Archaeology* 9:1-37.

1999 Precontact Archaeology of Northern Saskatchewan. In *Atlas of Saskatchewan*. 2nd ed., edited by K. Fung, pp. 23-24. University of Saskatchewan, Saskatoon.

Meyer, D. and D. Walde
2009 Rethinking Avonlea: Pottery Wares and Cultural Phases. *Plains Anthropologist*. 54(209)49-73.

Mokelki, L. L.
2007 *Vickers Focus and Mortlach: Examining Cultural Connections in the Makotchi-Ded Dontipi Locale*. Unpublished Master's thesis, Department of Archaeology,University of Saskatchewan, Saskatoon.

Morlan, R. E.
1988 Avonlea Radiocarbon Dating, In *Avonlea Yesterday and Today: Archaeology and Prehistory*, edited by L. B. Davis, pp. 291-309. Saskatchewan Archaeological Society, Saskatoon.

1994 Oxbow bison procurement as seen from the Harder site, Saskatchewan. Journal of Archaeological Science 21: 757-777.

Mulloy, W. B.
1958 A Preliminary Historical Outline for the Northwestern Plains. University of Wyoming Publications 22.

Neal, B. S.
2006 *Precontact Utilization of Sandhill Environments Durring the Pelican Lake and Besant Phases*. Unpublished Master's thesis, Department of Archaeology and Anthropology, University of Saskatchewan, Saskatoon.

Neuman, R. W.
1975 *The Sonota Complex and Associated Sites on the Northern Great Plains*. Nebraska State Historical Society, Publications in Anthropology No. 6. Lincoln.

Norris, D. S.
2007 *The Presence of Net-Impressed and Horizontally-Corded Ware in Southern Manitoba: the Relationships between Rock Lake and Brainerd Ware*. Unpublished Master's thesis, Department of Archaeology and Anthropology, University of Saskatchewan, Saskatoon.

Olsen, W.
2005 *Portraits of the Bison: an Illustrated Guide to Bison Society*. University of Alberta Press, Edmonton.

Pyszczyk, H. W.
2003 Aboriginal Bows and Arrows and Other Weapons in Alberta: The Last 2,000 Years, or Longer? In *Archaeology in Alberta: A View from the New Millennium* edited by J. W. Brink and J. F. Dormaar, pp. 46-71. Archaeological Society of Alberta, Medicine Hat, Alberta.

Ramsay, A.
1991 *The Melhagen Site: A Besant Kill in South Central Saskatchewan*. Unpublished Master's thesis, Department of Archaeology, University of Saskatchewan, Saskatoon.

Ramsay, C. L.
1993 *The Redtail Site: A McKean Habitation in South Central Saskatchewan*. Unpublished Master's thesis, Department of Archaeology, University of Saskatchewan, Saskatoon.

Reeves, B. O. K.
1970 *Culture Change in the Northern Plains: 1000 B.C. – A.D. 1000*. Unpublished Ph.D. dissertation, Department of Archaeology, University of Calgary.

1973 The Concept of an Altithermal Cultural Hiatus in Northern Plains Prehistory. *American Anthropologist* 75:1221-1253.

1978 Head-Smashed-In: 5500 Years of Boson Jumping in the Alberta Plains. *Plains Anthropologist Memoir 14*. 23(82)151-174.

1983 *Culture Change in the Northern Plains: 1000 B.C. – A.D. 1000*. Archaeological Survey of Alberta, Occasional Paper No. 20. Alberta Culture, Historical Resources Division, Edmonton.

1990 Communal bison hunters of the Northern Plains. In *Hunters of the Recent Past*, edited by L. B. Davis and B. O. K Reeves, pp.168-195. Unwin Hyman, London.

Reimer, P. J., M. G. L . Baillie, E. Bard, A. Bayliss, J. W. Beck, C. Bertrand, P. G. Blackwell, C. E. Buck, G. Burr, K. B. Cutler, P. E. Damon, R. L. Edwards, R. G. Fairbanks, M. Friedrich, T. P. Guilderson, K. A. Hughen, B. Kromer, F..G McCormac, S. Manning, C. Bronk Ramsey, R. W. Reimer, S. Remmele, J. R. Southon, M. Stuiver, S Talamo, FW Taylor,
J. van der Plicht, and CE Weyhenmeyer
2004 IntCal04 Terrestrial Radiocarbon Age Calibration, 0–26 Cal K yr BP. *Radiocarbon* 46:1029-1058.

Rutherford, J. S.
2004 *Hillsope Sediment and Landscape Evolution in Wanuskewin Heritage Park: A Geoarchaeological Interpretation*. Unpublished Master's thesis, Department of Archaeology, University of Saskatchewan, Saskatoon.

Saskatchewan Land Resource Centre
1999 Soils of Saskatchewan. In *Atlas of Saskatchewan*. 2nd ed., edited by K. Fung, pp.129-132. University of Saskatchewan, Saskatoon.

Schlesier, K. H.
1994 Commentary: A History of Ethnic Groups in the Great Plains A.D. 150-1550. In *Plains Indians, A.D. 500-1500: The Archaeological Past of Historic Groups*, edited by K. H. Schlesier, pp.308-381. University of Oklahoma Press, Norman.

Scribe, B.
1997 *Nistam Ka-ke Askihkokechik Puskwaw-askihk: An Assessment of Besant-Sonota Pottery on the Canadian Plains*. Unpublished Master's thesis, Department of Anthropology and Archaeology, University of Saskatchewan, Saskatoon.

Scuderi, L. A.
2002 The Holocene Environment. In *The Physical Geography of North America*, edited by A. Orme, pp.86-97. Oxford University Press, New York.

Simpson, M.
1999 Quaternary Geology. In *Atlas of Saskatchewan*. 2nd ed., edited by K. Fung, p. 85. University of Saskatchewan, Saskatoon.

Smith, A.
1999 Birds. In *Atlas of Saskatchewan*. 2nd ed., edited by K. Fung, p.150. University of Saskatchewan, Saskatoon.

Smith, B. J.
1986 *The Lebret site*. Unpublished M.A. Thesis, University of Saskatchewan, Saskatoon.

Stuiver, M. and P. Reimer
1993 Extended C14 Data Base and Revised Calib 3.0 C14 Age Calibration. *Radiocarbon* 35(1): 215-230.

Stuiver, M., P. J. Reimer, E. Bard, J. W. Beck, G. S. Burr, K. A. Hughen, B. Kromer, F.G. McCormac, J. v.d. Plicht, and M. Spurk
1998 INTCAL98 Radiocarbon Age Calibration 24,000 – 0 cal BP. *Radiocarbon* 40: 1041-1083.

Syms, E. L.
1977 Cultural Ecology and Ecological Dynamics of the Ceramic Period in Southwestern Manitoba. *Plains Anthropologist*. 22(76) pt.2

Thomas, D. H.
1978 Arrowheads and Atlatl Darts: How the Stones Got the Shaft. *American Antiquity:* 43:461- 472

Thornthwaite, C.W.
1948 An Approach Towards a Rational Classification of Climate. *Geographical Review*: 38.

Thorpe, J.
1999 Natural Vegetation. In *Atlas of Saskatchewan*. 2nd ed., edited by K. Fung, pp.134-137. University of Saskatchewan, Saskatoon.

Vance, R. E., A. B. Beaudoin, and B. H. Luckman
1995 The Paleoecological Record of 6 ka BP Climate in the Canadian Prairie Provinces. Geographie Physique et Quaternaire 49(1):81-98.

Vance, R. E., R. W. Matthewes, and J. J. Clague
1992 7000 Year Record of Lake-level Change on the Northern Great Plains: A High-Resolution Proxy of Past Climate. *Geology*, 20: 879-882.

Varsakis, I.
2006 *Besant Revisited: The Fincastle Site (DlOx-5) and Archaeological Cultures on the Northwestern Plains, 2500 B.P. – 1250 B.P.* Unpublished Master of Science Thesis, Department of Geography, University of Lethbridge, Lethbridge.

Vickers, J. R.
1986 *Alberta Plains Prehistory: A Review*. Archaeological Survey of Alberta Occasional Paper No. 27, Alberta Culture Historical Resources Division, Edmonton.

1994 Cultures of the Northwestern Plains: From the Boreal Forest Edge to Milk River. In *Plains Indians, A.D. 500-1500: The Archaeological Past of Historic Groups*, edited by Karl H. Schlesier, pp. 3-33. University of Oklahoma Press, Norman.

Vreeken, W.
1994 A Holocene Soil-Geomorphic Record From the Ham Site Near Frontier, Southwestern Saskatchewan, *Canadian Journal of Earth Sciences*, 31:531-543.

Walde, D.
2003 *The Mortlach Phase*. Occasional Papers of the Archaeological Society of Alberta No. 2.

Walker, E. G.
1983a *Archaeological Resource Assessment: The Tipperary Creek Project*. Meewasin Valley Authority, Saskatoon.

1983b *Saskatoon Perimeter Archaeological Resource Assessment*. Submitted to the City of Sasaktoon Planning Development. Investigation Permit No. 83-17, Saskatoon.

1988 Archaeological Resources of the Wanuskewin Heritage Park. In *Out of the Past*: *Sites, Digs and Artifacts in the Saskatoon Area*, edited by U. Linnamae and T. Jones, pp. 75-89. Saskatoon Archaeological Society, Saskatoon.

1992 *The Gowen Sites: Cultural Responses to Climatic Warming on the Northern Plains (7500-5000 B.P.)*. Archaeological Survey of Canada Mercury Series Paper 145. Canadian Museum of Civilization, Hull.

1999 Precontact Archaeology of Southern Saskatchewan. In *Atlas of Saskatchewan*. 2nd ed., edited by K. Fung, pp. 25-27. University of Saskatchewan, Saskatoon.

Walker, E. G., L. J. Amundson, and D. L. Kelly
1984 *Archaeological Field Investigations at the Tipperary Creek Conservation Area: 1984 Field Season*. Interim Report submitted to Meewasin Valley Authority and Archaeological Resource Management Section Saskatchewan Culture and Recreation, Saskatoon.

Wapple, R.
1999 Mammals. In *Atlas of Saskatchewan*. 2nd ed., edited by K. Fung, p. 142. University of Saskatchewan, Saskatoon.

Wedel, W. R.
1961 *Prehistoric Man on the Great Plains*. University of Oklahoma Press, Norman, Oklahoma.

Wettlaufer, B. N.
1955 *The Mortlach Site in the Besant Valley of Central Saskatchewan*. Anthropological Series No. 1, Department of Natural Resources, Regina.

Willey, G. R. and P. Phillips
1958 *Method and Theory in American Archaeology*. University of Chicago Press, Chicago.

Wolfe, S. A., J. Ollerhead, D. J. Huntley, and O. B. Lian
2006 Holocene dune activity and environmental change in the prairie parkland and boreal forest, central Saskatchewan, Canada. *The Holocene* 16(1):17-29

Wolfe, S. A., C. H. Hugenholtz, C. P. Evans, D. J. Huntley, and J. Ollerhead
2007 Potential Aboriginal-occupation-induced dune activity, Elbow Sand Hills, Northern Great Plains, Canada. *Great Plains Research* 17:173-192.

Wormington, H. M., and R. G. Forbis
1965 *An Introduction to the Archaeology of Alberta, Canada*. Proceedings No. 11, Denver Museum of Natural History, Denver, Colorado.

Appendix A: Cultural Chronology

Table A.1 Cultural Occupations Recorded at Wanuskewin Heritage Park.

Site Name	Site Type	Cultural Components	Level	Radiocarbon Ages*	Sample #	Specimen	Diagnostics
formerly, Tipperary Creek FbNp-1 (Harty 2005)	Multicomponent habitation Late Plains Period series	Historic/Protocontact	1	<100 years	S-2805	bone	Mortlach pottery; metal + S.N. points
		Mortlach phase (Lozinsky sub-phase)	2	380 ± 70 years B.P.	S-2806	bone	Mortlach pottery, points
			3	200 ± 70 years B.P.	S-2807	charcoal	Mortlach pottery, points
			4	290 ± 70 years B.P.	S-2808	charcoal	Mortlach pottery, point
			5	510 ± 70 years B.P.	S-2809	bone	Mortlach pottery, points
		Old Women's phase	6	790 ± 135 years B.P.	S-2810	bone	Ethridge Ware; Cayley points
			7	855 ± 70 years B.P.	S-2811	charcoal	Ethridge Ware; Cayley points
			8	800 ± 70 years B.P.	S-2812	bone	Ethridge Ware
			9	945 ± 135 years B.P.	S-2813	bone	no diagnostics
			10	1155 ± 75 years B.P.	S-2814	bone	Ethridge Ware; Cayley points
		early Late Precontact	11	1235 ± 75 years B.P.	S-2815	bone	no diagnostics
		Avonlea	12	1790 ± 75 years B.P.	S-2816	bone	Avonlea points
		Avonlea/Besant	13	1535 ± 75 years B.P.	S-2885	bone	Avonlea + Samantha points
Medicine Wheel FbNp-2	boulder alignment	Late Precontact	S	-	-	-	Side-notched point
Mosquito FbNp-5	single component habitation; partially disturbed.	Oxbow	S/1	-	-	-	Oxbow point
Sunburn Tipi Ring FbNp-7	9 tipi rings adjacent to medicine wheel.	Precontact	1	-	-	-	no diagnostics
Crowsnest FbNp-8	single component buried habitation area	Late Precontact	1	-	-	-	surface side notched point; no buried diagnostics
Meewasin Creek FbNp-9	Multicomponent bison procurement, processing, + habitation site Middle + Late Precontact	Proto-/Postcontact	1	-	-	-	pottery, ammunition
		Avonlea	2	-	-	-	Avonlea pottery
		Un-named/Middle-Late Precontact transitional	3	1754 ± 45 cal. yrs B.P. 2130 ± 125 cal. yrs B.P.	S-2366 BGS 2742	bone bone	pottery, un-named point, triangular preform/un-notched point.
		Sandy Creek	3A	2405 ± 50 cal. yrs B.P.	BGS 2740	charcoal	Sandy Creek point
		Pelican Lake	4A	-	-	-	Pelican Lake point
		McKean	4B	2286 ± 70 cal. yrs B.P.	BGS 2743	bone	McKean Point Level 4.
		Middle Precontact	5A	3750 ± 120 cal. yrs B.P.	BGS 2741	charcoal	-
		Duncan	5B	-	-	-	Duncan point
Redtail FbNp-10 (Ramsay 1993)	Multicomponent habitation	Avonlea + Besant	2	-	-	-	Avonlea + Besant points
		Late Middle Precontact	3-10	-	-	-	no diagnostics; pithouse feature L.8
		McKean Complex	11	3480 ± 80	S-3372	bone	Hanna point
			12(1)	3470 ± 80	S-3373	bone	-
			12(2)	3660 ± 75	S-3008	bone	Hanna points
			13(1)	-	-	-	Hanna point
			13(2)	3860 ± 70	S-3374	bone	McKean Lanc., Duncan points
			13(2)	3880 ± 70	S-3375	bone	McKean Lanceolate points
			13(4)	4280 ± 80	S-3009	bone	McKean Lanceolate points
			15(2)	5010 ± 90	S-3007	bone	no diagnostics: Mummy cave age?

Table A.1 Cultural Occupations Recorded at Wanuskewin Heritage Park Continued.

Site Name	Site Type	Cultural Components	Level	Radiocarbon Ages*	Sample #	Specimen	Diagnostics
Dusty Horn (FbNp-13)	Single component site	Late Precontact	-	-	-	-	pottery
Newo Asiniak FbNp-16 (Kelly 1986)	kill site	Late Precontact	1	185 ± 190 (A.D. 1765)	S-2763	bone	Plains Side-notched points
		Late Precontact	2	1540 ± 70 B.P. (A.D. 410)	S-2528	bone	no diagnostics
	processing/habitation	Late Precontact	1	750 ± 70 B.P. (AD 1200)	S-2529	bone	Plains Side-notched points
		Avonlea	2	915 ± 70 B.P. (A.D. 1035)	S-2335	bone	Avonlea points
		Besant	3	2235 ±75 B.P. (285 B.C.)	S-2530	bone	Besant points
		Pelican Lake	4	3025 ± 215 B.P. (1075 B.C.)	S-2764	bone	Pelican Lake points
		Late Middle Precontact	5	2525 ± 210 B.P. (575 B.C.)	S-2765	bone	no diagnostics
		Middle Precontact	6	4320 ± 85 B.P. (2370 B.C.)	S-2532	bone	no diagnostics
		Middle Precontact	7	3455 ± 230 B.P. (1505 B.C.)	S-2766	bone	no diagnostics
Amisk FbNp-17 (Amundson 1987)	Multicomponent habitation	Late Side-Notched series:	1	480 ± 65 (A.D. 1470)	S-2531	charcoal	Plains, Prairie, Avonlea points
		Plains, Prairie		635 ± 85 (A.D. 1315)	S-2770	bone	
		Avonlea		905 ± 155 (A.D. 1045)	S-2537	bone	
		Middle Precontact	2	3055 ± 70 (1105 B.C.)	S-2769	bone	no diagnostics; buried stone circles
		Middle Precontact	3	3530 ± 110 (1580 B.C.)	S-2767	bone	no diagnostics
		Oxbow	4	4015 ± 195 (2065 B.C.)	S-2546	bone	no diagnostics
		Oxbow	5	4120 ± 190 (2170 B.C.)	S-2535	bone	no diagnostics
		Oxbow	6	3895 ± 195 (1945 B.C.)	S-2534	bone	no diagnostics
		Middle Precontact	7	5340 ± 120 (3390 B.C.)	S-2768	bone	no diagnostics
Opimihaw FbNp-18	Multicomponent bison jump + assoc. processing/habitation	Late Precontact	1-8	-	-	-	no diagnostics
		Precontact	9	2375 ± 140 B.P. (425 B.C.)	S-2375	bone	no diagnostics
Juniper Flats FbNp-19	Multicomponent habitation area	Precontact	1-7	-	-	-	no diagnostics
Cathedral Peak FbNp-20	Vision quest site	Late 1800s*	S	-	-	-	*Walker 1988:87
	Single component habitation	Precontact	1	-	-	-	no diagnostics
Buena Vista FbNp-21 Cut Arm Creek FbNp-22 (unpublished)	Single component habitation Multicomponent habitation	Precontact	1	-	-	-	no diagnostics
		Proto-Contact	1	-	-	-	Metal point
		Plains Side-Notched	2	524±40 B.P. (cal. 650 B.P.)	BSG 2381	bone	Plains S.N. point
		Prairie Side-Notched	3	-	-	-	Prairie S.N. point
		Avonlea	4	-	-	-	Avonlea point
		Besant	5	-	-	-	Besant point
		Pelican Lake	6	3,178±50 B.P.(3,550 cal.B.P.)	BSG 2382	bone	Pelican Lake point
		McKean	7	3,387±50 B.P.(3,690 cal.B.P.)	BSG 2383	bone	McKean point
		Oxbow	8	3,448±60 B.P.(3,770 cal.B.P.)	BSG 2384	bone	Oxbow point
		pos. Mummy Cave Series	9	3,802±55 B.P.(4,270 cal.B.P.)	BSG 2385	bone	Early S.N. point

Table A.1 Cultural Occupations Recorded at Wanuskewin Heritage Park Continued.

Dog Child FbNp-24 (Cyr 2006)	Multicomponent habitation	Proto-contact/ Middle Precontact mixed	1	-	-	-	Plains, + Prairie S.N. points, also Oxbow point
		Late Precontact Period	1a	-	-	-	Plains, Prairie S.N., Duncan points
		Late Precontact Period	1b	241±50 B.P.(300 cal. B.P.)	BGS 2659	charcoal	Plains, Prairie S.N., Besant points
		Duncan/Hanna Complex	2a	3460±45 B.P.(3700 cal. B.P.)	BGS 2660	bone	Duncan + Hanna points
		Oxbow Complex	2b	3867±50 B.P.(4270 cal. B.P.)	BGS 2661	bone	Oxbow points
		Mummy Cave Series	3a	4597±50 B.P.(5310 cal. B.P.)	BGS 2662	bone	Mummy Cave points
		Mummy Cave Series	3b	4780±50 B.P.(5530 cal. B.P.)	BGS 2663	bone	Mummy Cave points
Thundercloud FbNp-25 (Mack 2000; Webster 1999)	Multicomponent processing/ habitation	Proto/Late Precontact	1	-	-	-	metal diagnostics, Mortlach sherds, Plains, Prairie S.N. points
		Late Precontact/Mortlach	2	-	-	-	Plains, Prairie S.N.+ Avonlea points
		Besant/Avonlea	3	-	-	-	Besant pts.; Avonlea points + pottery
		Precontact	4	-	-	-	no diagnostics
		McKean Complex	5	4140±90 B.P.	S-3645	bone	McKean lanc., Duncan, Hanna points
		Oxbow	6B	-	-	-	Oxbow points
		Precontact	7	-	-	-	no diagnostics
Wolf Willow FbNp-26	Multicomponent occupation; 15 cairns/drive lane markers	Precontact	1-4	-	-	-	no diagnostics
Star Gazer FbNp-27	Single component habitation w/ lithic scatter	McKean	1	-	-	-	McKean points

Abbreviations: S = Surface; S.N. = Side-notched; pts = projectile points; cal. = Calibrated Age after applying C13 Isotope Correction (same ± variability as uncalibrated results); lanc.=lanceolate; L. = Level; * Radiocarbon ages are uncorrected unless otherwise noted.

Table A.2 Chronology of Meewasin Creek (FbNp-9) with Diagnostics.

Cultural Level		Artifact/ Ecofact Type	Cultural Affiliation	Cultural Date Ranges	Radiocarbon Ages (Calibrated)
C1		Dominion Cartridge Company .22 cal. shell	Post–Contact	(after A.D. 1900) 50 B.P. – present	–
C2		Pottery Sherd	Rock Lake Net–Impressed	1800 – 900 B.P.	–
		Pottery Sherd	Avonlea Plainware	1800 – 900 B.P.	–
		Bone (BSG 2742)	–	–	1660 ± 45 B.P.*
C3		Bone (S–2366)	–	–	2090 ± 275 B.P.
		Projectile Point	Un–Named/ Outlook	*circa* 2500 B.P.	–
C3A		Projectile Point	Sandy Creek	2450 – 1950 B.P.	–
		Charcoal (BSG–2740)	–	–	2360 ± 50 B.P.
C4	**C4A**	Projectile Point	Pelican Lake	3300 – 1850 B.P.	–
	C4B	Bone (BSG–2743)	–	–	2340 ± 70 B.P.
	C4	Projectile Point	McKean (?)	4150 – 3100 B.P.	–
C5	**C5A**	Charcoal (BSG–2741)	–	–	4120 ± 120 B.P.
	C5B	Projectile Point	Duncan	4150 – 3100 B.P.	–
C6		Tools	Precontact	–	–
C7		Biface	Precontact	–	–
* Date must be considered cautiously.					

Appendix B: Radiocarbon Analysis

Table B.1 Level C2 Calibrated Radiocarbon Ages. (Stuiver and Reimer 1993)

Faunal Sample: BGS 2742			
Uncalibrated Age: 1722 ± 45 B.P.			
Calculated with C12/13 Isotope correction: 1754 ± 45 B.P. ($\delta^{13}C$ = -23.01‰)			
Calibrated Age: 1660 ± 46 B.P.			
Age Ranges Obtained By Intercepts			
One Sigma		**Two Sigma**	
1712 - 1574 cal B.P.		1817 - 1542 cal B.P.	
Best Age Ranges Obtained from Probability Distribution			
One Sigma	**Probability**	**Two Sigma**	**Probability**
1714 - 1605 cal B.P. cal A.D. 236 - 345	0.942	1742 - 1550 cal B.P. cal A.D. 133 - 408	0.905

Table B.2 Level C3 Calibrated Radiocarbon Ages. (Stuiver and Reimer 1993)

Faunal Sample: S-2366			
Uncalibrated Age: 2130 ± 125 B.P.			
Calibrated Age: 2090 ± 275 B.P.			
Best Age Ranges Obtained from Probability Distribution			
One Sigma	**Probability**	**Two Sigma**	**Probability**
2209 - 1991 cal B.P. cal 259 - 41 B.C.	0.736	2365 – 1814 cal B.P. cal 415 B.C. - A.D. 136	0.996
Intcal104.c calibration set, Reimer et al 2004			

Table B.3 Level C3A Calibrated Radiocarbon Ages. (Stuiver and Reimer 1993)

Charcoal Sample: BGS 2740			
Uncalibrated Age: 2416 ± 50 B.P.			
Calculated with C12/13 Isotope correction: 2405 ± 50 B.P. ($\delta^{13}C$ = -25.67‰)			
Calibrated Age: 2360 ± 50 B.P.			
Age Ranges Obtained By Intercepts			
One Sigma		**Two Sigma**	
2704 - 2349 cal B.P.		2711 - 2339 cal B.P.	
Best Age Ranges Obtained from Probability Distribution			
One Sigma	**Probability**	**Two Sigma**	**Probability**
2472 - 2349 cal B.P. 523 - 400 cal B.C.	0.777	2513 - 2342 cal B.P. 564 - 393 cal B.C.	0.659

Table B.4 Level C4B Calibrated Radiocarbon Ages. (Stuiver and Reimer 1993)

Faunal Sample: BGS 2743			
Uncalibrated Age: 2258 ± 70 B.P.			
Calculated with C12/13 Isotope correction: 2286 ± 70 B.P. ($\delta^{13}C$ = -23.28‰)			
Calibrated Age: 2340 ± 70 B.P.			
Age Ranges Obtained By Intercepts			
One Sigma		**Two Sigma**	
2350 - 2161 cal B.P.		2433 - 2123 cal B.P.	
Best Age Ranges Obtained from Probability Distribution			
One Sigma	**Probability**	**Two Sigma**	**Probability**
2266 - 2178 cal B.P. 4317 - 229 cal B.C.	0.536	2471 - 2115 cal B.P. 522 - 166 cal B.C.	0.979

Table B.5 Level C5A Calibrated Radiocarbon Ages. (Stuiver and Reimer 1993)

Charcoal Sample: BGS 2741			
Uncalibrated Age: 3731 ± 120 B.P.			
Calculated with C12/13 Isotope correction: 3750 ± 120 B.P. ($\delta^{13}C$ = -23.83‰)			
Calibrated Age: 4120 ± 120 B.P.			
Age Ranges Obtained By Intercepts			
One Sigma		**Two Sigma**	
4346 - 3928 cal B.P.		4437 - 3731 cal B.P.	
Best Age Ranges Obtained from Probability Distribution			
One Sigma	**Probability**	**Two Sigma**	**Probability**
4262 - 3961 cal B.P. 2313 - 2012 cal B.C.	0.893	4423 - 3826 cal B.P. 2472 - 1877 cal B.C.	0.983

Appendix C: Lithic Analysis

Appendix C. Table C.1 Meewasin Creek Projectile Point Metric Data.

Level	Cat. #	Max. Length (mm)	Max. Width (mm)	Max. Thick. (mm)	Body Length (mm)	Base Width (mm)	Base Height Left (mm)	Base Height Right (mm)	Basal Indent (mm)	Notch Depth Left (mm)	Notch Depth Right (mm)	Notch Width Left (mm)	Notch Width Right (mm)	Neck (mm)	Weight
Surf.	34	21.3*	19.1	5.8	10.5*	19.0	2.8	3.1	0	1.3	1.1	5.3	5.3	16.3	2.5 g
C3	2246	17.2*	20.9	5.0	-	-	-	-	-	2.8	2.8	-	-	13.9	2.5 g
	3047	20.3*	19.1	5.35	-	19.1	-	-	2.1	-	-	-	-	-	2.0 g
	4054	22.5*	17.8	4.9	-	14.5	0.6	1.7	0	2.2	2.0	4.3	5.0	11.7	2.1 g
C3A	2896	20.8	15.7*	5.75	15.0	-	1.8	-	.6	1.5	-	4.3	-	13.5	1.7 g
C4	1277	20.6*	22.8	5.9	-	21.2	7.0	3.4	2.5	-	-	-	-	-	3.4 g
C4A	4798	39.9*	17.75	4.35	-	-	-	-	-	3.6	-	-	-	-	3.7 g
	6068	_	-	-	-	-	-	-	-	-	-	-	-	-	.1 g
C4B	5331	33.4*	18.3	6.1	-	-	-	-	-	3.7	-	-	-	11.0	4.5 g
C5B	5183	30.9	16.7	5.3	19.2	19.8	3.8	2.7	1.4	.5	.7	8.8	11.8	15.0	2.6 g
C5B	5202	_	-	-	-	-	-	-	-	-	-	-	-	-	0.3 g

* Denotes an incomplete measurement.

Appendix C. Table C.2 Meewasin Creek Projectile Point Non-metric Data.

Level	Cat. #	Unit	Complete-ness	Cultural Affiliation	Material	Longitudinal Cross-Section	Transverse Cross-Section	General Symmetry	General Quality	Basal Edge Shape	Basal Edge Mod.
Surface	34	-	missing tip	Besant	SRC	BCV	BCV	SASYM	fair	ST	thinned, ground
C3	2246	22S 8E	midsection	Besant?	SRC	BCV	ASYM BCV	SYM	good	-	-
	3047	17S 5E	base/ midsection	un-notched preform	SRC (H/T)	BCV	ASYM BCV	ASYM	fair	ASYM CC	thinned
	4054	18S 6E	missing tip	Besant	chert	BCV	BCV	ASYM	poor: step fractures	ST	thinned
C3A	2896	17S 4E	missing 1 ear + notch	Sandy Creek	chert	BCV	BCV	SYM	good	IR	thinned, retouched
C4	1277	21S 5E	missing tip	McKean	chert	ASYM BCV	BCV	SASYM	fair	ASYM CC	thinned
C4A	4798	20S 7E	missing tip + base	Pelican Lake	KRF	-	BCV	SYM	excellent	-	-
	6068	22S 11E	tip	-	chert	-	BCV	-	-	-	-
C4B	5331	21S 9E	missing tip + base	Duncan/ Hanna transition	SRC	PCV	BCV	SASYM	very poor/ unfinished	-	-
C5B	5183	20S 9E	complete	Duncan	SRC	BCV	BCV	SYM	good	ASYM CV	thinned
C5B	5202	20S 9E	tip	-	SRC	-	BCV	-	-	-	-

Abbreviations: H/T = Heat treated; SYM = Symmetrical; ASYM = Asymmetrical; SASYM = Slightly Asymmetrical; BCV = Biconvex; CC = Concave; PCV = Plano-convex; ST = Straight; IR = Irregular

Appendix C. Table C.3 Non-Metric Analysis of Formed Tools: Surface, Level 1, Level 2.

Level	Cat. #	Unit	Material	Tool Type	Modification	Shape	Primary Working Edge (Location)	Secondary Working Edge (Location)	Long-itudinal Cross Section	Trans-verse Cross-Section
Surface	18	-	quartz	uniface: flake	retouched	lenticular	straight (distal)	straight (lateral)	concave/ convex	triangular
	32	-	SRC	uniface: flake fragment	retouched	-	straight (lateral)	convex (lateral)	planar-convex	bi-convex
	33	-	SRC	unifacial flake fragment	retouched	polygonal	straight (lateral)	-	concave/ convex	planar-convex
?	322	Profile	red jasper	endscraper fragment	retouched	circular/ polygonal	convex (distal)	-	planar-convex	rectangular
C1	43	TP 1	quartz	biface	thinned, retouched	lanceolate	convex (lateral)	convex (lateral)	planar-convex	bi-convex
	197	TP 3B	SRC (H/T)	unifacial flake fragment	thinned	-	convex	-	-	planar-convex
C2	254	TP 3B	sandstone	utilized flake	retouched impacted	wide crescent	convex (distal/ lateral)	convex/ concave (lateral)	planar-convex	planar-convex
	267	TP 3B	grey chert	biface fragment	thinned, retouched	broken	-	-	-	bi-convex
	1557	22S 6E	silicified peat	biface fragment	retouched	irregular/ angular	straight	-	concave/ convex	convex/ concave
	3979	18S 6E	Athabasca quartzite	utilized flake	use wear/ impacted	large spall	convex (distal)	straight (lateral)	convex/ concave	triangular
	4112	18.5S 5E	grey chert	end/sidescraper fragment	retouched	rectangular	convex	straight	parallel straight	parallel straight

H/T = Heat treated.

Appendix C. Table C.4 Non-Metric Analysis of Formed Tools: Level 3 to Level 3A.

Level	Cat. #	Unit	Material	Tool Type	Modification	Shape	Primary Working Edge (Location)	Secondary Working Edge (Location)	Long-itudinal Cross Section	Trans-verse Cross-Section
C3	793	21S 3E	SRC	unifacial flake fragment	retouched	broken	-	-	-	-
	874	22S 3E	chalcedony	endscraper preform	primary flake	polygonal	-	-	planar-concave	bi-planar
	3692	18S 5E	basalt	utilized flake	bifacially retouched	triangular/ irregular	convex (lateral)	serrated (lateral)	planar-convex	bi-convex
	4900	20S 8E	silicified peat (H/T)	unifacial flake	retouched	rectangular	concave/ convex	-	convex/ concave	planar-convex
	5548	21S 10E	white chert	unifacial flake fragment	utilized	bi-convex edges	convex (lateral)	-	planar-convex	bi-convex
	6232	22S 12E	quartz	biface fragment	thinned	broken midsection	straight (lateral)	-	parallel straight	bi-convex
Between C3+3A	6238	22S 12E	SRC	thick biface fragment	thinned edge	square corner	straight	-	bi-convex	bi-planar
C3A	1275	21S 5E	quartzite	possible spokeshave	unifacially retouched	polygonal/ broken	concave	-	planar-convex	polygonal
	3472	18S 4E	chert (H/T)	biface fragment	thinned, retouched	rounded	convex	-	planar-convex	bi-convex
	3730	18S 5E	SRC (H/T)	uniface fragment	thinned edge	crescent	convex	-	planar-convex	convex/ concave
	3784	18S 5E	white chert	endscraper fragment	retouched edge	crescent	convex	-	-	convex/ concave
	3920	17S 6E	SRC (H/T)	utilized flake (spokeshave?)	retouched, utilized	irregular	straight (distal)	concave (lateral)	triangular	triangular

H/T = Heat treated.

Appendix C. Table C.5 Non-Metric Analysis of Formed Tools: Level 4, Level 4B.

Level	Cat. #	Unit	Material	Tool Type	Modification	Shape	Primary Working Edge (Location)	Secondary Working Edge (Location)	Long-itudinal Cross Section	Trans-verse Cross-Section
C4	1276	21S 5E	quartzite	unifacial primary flake	retouched	rectangular	convex/ irregular	-	bi-planar	bi-planar
	1496	21S 6E	chalcedony (H/T)	utilized flake	utilized	rounded	convex	-	planar-convex	planar-convex
	1908	22S 7E	quartzite	bifacial flake fragment	thinned, retouched	elongated triangle	straight (lateral)	pointed (distal)	planar-convex	bi-convex?
	2299/ 2311	22S 8E	quartzite	biface fragment	thinned	crescent fragment	convex	-	bi-convex	bi-convex
	2303	22S 8E	white chert	unifacial flake	retouched	"D" shaped	straight/ convex	-	convex/ concave	planar-concave
	2898	17S 4E	quartzite	utilized flake	marginally retouched	rectangular	straight/con-vex (distal)	-	planar-convex	planar-convex
	3108	17S 5E	silicified peat	utilized flake	smoothed distal edge	rounded polygon	convex (distal)	-	bi-convex	bi-convex
	3532	18S 4E	quartzite	utilized flake	utilized/ retouched	polygonal	convex (distal)	-	concave/ convex	rhomboidal
	3537	18S 4E	petrified wood	sidescraper	retouched edge	polygonal	straight (lateral)	-	bi-planar	planar-convex
	3795	18S 4E	grey chert	endscraper preform	thinned primary flake	teardrop	convex (distal)	-	planar-convex	planar-convex
C4B	2068	21S 8E	grey chert	unifacial flake	retouched	irregular; rounded	concave/vex (lateral)	-	convex/ concave	bi-convex
	4988	20S 8E	SRC (H/T)	unifacial flake fragment	retouched	crescent	convex	-	bi-planar	bi-convex
	5166	20S 9E	chert (H/T)	uniface	retouched shatter	irregular; angular	convex (lateral)	-	planar-convex	planar-convex

H/T = Heat treated.

Appendix C. Table C.6 Non-Metric Analysis of Formed Tools: Interlayer 4/5, Level 5, Level 5A, Interlayer 5A/B.

Level	Cat. #	Unit	Material	Tool Type	Modification	Shape	Primary Working Edge (Location)	Secondary Working Edge (Location)	Long-itudinal Cross Section	Trans-verse Cross-Section
Between C4+ C5	3820	18S 5E	cathead chert	bifacial fragment	thinned	symmetrical	convex	convex	convex/ concave	bi-convex
	6267	22S 12E	chert	utilized flake fragment	use-wear	blade tip	convex (distal)	-	-	planar-convex
	6086	22S 11E	silicified wood	uniface	retouched	rectangular	straight (lateral)	-	bi-planar	triangular
C5	532	22S 0E	black chert	endscraper	retouched, bipolar percussion	rounded polygon	convex	-	planar-convex	planar-convex
	1166	22S 4E	SRC	utilized primary flake	use-wear	polygonal	straight (lateral)	-	planar-convex	planar-convex
	1287	21S 5E	SRC	biface fragment	thinned	rectangular/ broken	convex	possible notch	planar-convex	planar-convex
	1913	22S 7E	agate	end/sidescraper	retouched	rhombus	convex (distal)	straight (lateral)	planar-convex	planar-convex
C5A	2151	21S 8E	chert	end/sidescraper	retouched	square	convex (distal)	straight (lateral)	planar-convex	planar-convex
	5007	20S 8E	banded chert	uniface	retouched	triangular	slightly convex	-	bi-convex	bi-convex
	6271	22S 12E	grey chert	sidescraper/graver/ spokeshave	retouched	pentagonal	straight (x2) (lateral)	concave; (distal)	planar-convex	planar-convex
Between 5A+5B	5909	22S 10E	jasper	endscraper	retouched; expired	rectangular	convex	-	planar-convex	triangular

Appendix C. Table C.7 Non-Metric Analysis of Formed Tools: Level 5B, Level 7.

Level	Cat. #	Unit	Material	Tool Type	Modification	Shape	Primary Working Edge (Location)	Secondary Working Edge (Location)	Long-itudinal Cross Section	Trans-verse Cross-Section
C5B	5181	20S 9E	grey chert	unifacially retouched flake	retouch	triangular	serrated (lateral)	-	planar-convex	triangular
	5199	20S 9E	quartz	notched uniface fragment	notched/ retouched	irregular	straight	-	planar-convex	bi-convex
	5764	22S 9E	SRC	biface fragment	thinned	rectangular	straight (lateral)	straight (lateral)	bi-convex	bi-convex
	5928	22S 10E	SRC	sidescraper	retouched	rectangular	straight/convex: 22.0	-	convex/ concave	bi-convex
	6106	22S 11E	SRC (H/T)	hafted biface base	thinned, ground, notched	symmetrical; asym. concave base	(lateral/ distal)	(lateral/ distal)	-	bi-convex
	6114	22S 11E	chalcedony	endscraper	pos. notched, retouched	irregular	straight	-	bi-planar	bi-convex
C7	626	22S 1E	SRC	biface	thinned; coarse	circular	convex	straight	bi-convex	bi-convex

H/T = Heat treated.

Table C.8 Metric Analysis of Formed Tools: Surface to Level 3A.

Level	Cat. #	Weight	Primary Working Edge (mm)	Secondary Working Edge (mm)	Maximum Length (mm)	Maximum Width (mm)	Maximum Thickness (mm)
Surface	18	42.2 g	21.5	16.5; 18.0	58.4	49.8	16.3
	32	2.6 g	*23.2	*20.4	*21.5	20.0	5.3
	33	4.0 g	15.4	-	*24.6	21.5	7.0
Profile	322	3.8 g	20.9	-	23.1	*19.6	7.5
1	43	36.0 g	60.0	*55.5	56.5	38.0	16.1
	197	.9 g	*3.5	-	*13.5	*14.2	*6.1
C2	254	66.3 g	47.0	46.8	67.8	61.8	17.9
	267	.4 g	-	-	13.0	*5.5	*5.1
	1557	.3 g	*9.2	-	*12.4	*12.8	*2.8
	3979	410.9 g	55.3	5.10	140.7	65.7	45.5
	4112	1.4 g	24.5	*8.3	35.5	*9.4	10.0
C3	793	.5 g	-	-	*14.8	*13.7	3.1
	874	6.3 g	(26.3)	-	30.2	24.1	9.9
	3692	3.6 g	21.5	18.0	27.2	20.3	9.4
	4900	10.9 g	50.9	-	54.8	29.7	7.5
	5548	5.4 g	*19.0	-	*26.2	29.7	7.3
	6232	5.6 g	*13.5	-	*16.0	28.3	8.8
Between C3+3A	6238	7.9 g	*30.3	-	*18.1	34.4	12.5
C3A	1275	4.0 g	*6.5	-	*26.6	21.5	6.9
	3472	7.3 g	*19.0		*25.1	27.4	9.0
	3730	1.0 g	28.8	-	*25.7	*8.5	*6.8
	3784	2.1 g	*32.8	-	*27.2	*8.5	*6.8
	3920	12.9 g	21.2	17.3	43.7	32.7	9.5

* Denotes an incomplete measurement.

Table C.9 Metric Analysis of Formed Tools: Level 4 to Level 7.

Level	Cat. #	Weight	Primary Working Edge (mm)	Secondary Working Edge (mm)	Maximum Length (mm)	Maximum Width (mm)	Maximum Thickness (mm)
C4	1276	61.8 g	60.5	-	66.2	53.8	11.5
	1496	.7 g	18.5	-	*17.2	*13.6	*5.9
	1908	3.8 g	31.7	*4.0	37.0	*18.0	6.6
	2299/ 2311	6.1 g 30.6 g	*7.8/ *32.0	-	*43.6 *32.4	*15.7 52.8	11.6 6.3
	2303	1.1 g	19.7	-	22.0	14.7	3.1
	2898	432.3 g	61.5	-	114.3	75.7	41.2
	3108	1.1 g	15.0	-	22.0	16.5	2.9
	3532	95.0	35.3	-	75.7	48.2	23.2
	3537	3.1 g	18.8	-	*31.0	20.8	4.3
	3795	13.0 g	22.8	-	36.6	26.8	11.4
C4B	2068	4.8 g	39.1	-	39.8	24.5	4.4
	4988	10.5 g	29.4	-	*20.7	*43.5	10.8
	5166	6.4 g	15.8	-	36.9	18.2	9.9
Between C4 + C5	3820	3.3 g	*15.1	*14.8	*23.6	21.5	7.4
	6267	0.2 g	1.0	-	*7.1	*8.2	3.1
	6086	2.0 g	*8.3	-	*21.3	14.0	6.8
C5	532	.8 g	14.5	6.1	14.1	11.6	4.0
	1166	6.6 g	19.3	-	17.9	19.1	10.0
	1287	3.1 g	25.5	8.5	*25.8	*16.8	6.1
	1913	.7 g	13.0	9.5	11.4	12.8	4.6
C5A	2151	.9 g	13.2	*10.8; *10.4	*12.8	13.0	4.9
	5007	1.4 g	19.5	-	23.4	14.8	3.8
	6271	9.7 g	20.0	14.8; 17.0	37.7	22.9	10.2
Between 5A + 5B	5909	.4 g	14.5	-	9.7	13.3	4.1
C5B	5181	2.0 g	13.5	-	*21.1	15.4	6.5
	5199	.9 g	*8.6	-	*15.1	*13.4	4.0
	5764	5.9 g	*17.0	*11.0	*3.5	*25.0	*8.1
	5928	3.7 g	22.0	-	*24.0	18.6	7.0
	6106	3.6 g	-	-	*20.5	*28.1	7.1
	6114	.7 g	10.5	-	9.5	14.4	4.6
C7	626	34.5 g	56.8	38.0	48.4	40.9	15.1
* Denotes an incomplete measurement.							

Appendix C. Table C.10 Rocky Island Projectile Point Metric Data.

Specimen	Depth (cm)	Max. Length (mm)	Max. Width (mm)	Max. Thick. (mm)	Body Length (mm)	Base Width (mm)	Base Height Left (mm)	Base Height Right (mm)	Basal Indent (mm)	Notch Depth Left (mm)	Notch Depth Right (mm)	Notch Width Left (mm)	Notch Width Right (mm)	Neck (mm)	Mass (g)
1	17	28.1	20.3	4.4	-	-	-	-	-	-	-	-	-	-	2.4
2	18	22.7	17.1	4.5	16.1	*15.8	3.8	-	1.0	3.0	-	3.9	-	12.3	1.4
3	19	*17.5	19.2	5.1	-	19.2	3.5	3.0	.0	*3.8	3.2	-	3.7	12.4	1.6

Appendix C. Table C.11 Rocky Island Projectile Point Non-metric Data.

Specimen	Level	Unit	Complete-ness	Cultural Affiliation	Material	Longitudinal Cross-Section	Transverse Cross-Section	Shape/ General Symmetry	General Quality	Basal Edge Shape	Basal Edge Mod.
1	2	18a	~complete/ broken	Bratton	chalced ony	bi-planar/ bevelled edges†	triangular†	lanceolate/ SASYM	poor/ unfinished	convex	retouched/ ground
2	2	Test 3	~complete	Pelican Lake	yellow chert	bi-convex	diagonal	triangular/ SYM	fair/good	convex/ indent	thinned
3	2	Test 5	missing tip + tang	Pelican Lake/ Un-named	grey chert	bi-convex	bi-convex	SYM	fair/good	straight	thinned/ retouched
Abbreviations: SYM = Symmetrical; SASYM = Slightly											

Table C.12 Rocky Island (FaNp-7) Tool Analysis.

Specimen	Level	Tool	Material	Notes
1	Surface	utilized flake	SRC	long spall w/ usewear
2	Surface	utilized flake	KRF	secondary flake
3	Surface	utilized flake	Gronlid Siltstone	secondary flake
4	Surface	utilized flake	silicified peat	
5	Surface	retouched flake	SRC	utilized
6	Surface	sidescraper	quartzite	fragment
7	Surface	sidescraper	quartz	retouch on 1 side
8	Surface	hammerstone	RMQ	possibly hafted
9	L2	utilized flake	cathead chert	
10	L2	utilized flake	KRF	secondary decortication flake
11	L2	utilized flake	silicified wood	
12	L2	utilized flake	silicified peat	unifacial; utilized
13	L2	endscraper	agate	triangular
14	L2	end/sidescraper	KRF	
15	L2	sidescraper	SRC	modified flake
16	L2	blade/perforator	SRC	modified flake
17	L2	pos. drill	petrified wood	broken tip. 1 smooth side.
18	L2	biface	silicified peat	broken preform? Triangular
19	L2	biface	silicified peat	fragment
20	L2	biface	agate	fragment
21	L3	sidescraper	SRC	h/t
22	L3	sidescraper	SRC	
23	L3	utilized flake	silicified peat	
24	L3	utilized flake	obsidian	
25	L3	utilized flake	KRF	19 cm bs
26	L3	utilized flake	KRF	fragment
27	L3	utilized flake	SRC	
28	L3	retouched flake	obsidian	utilized - side
29	L3	retouched flake	SRC	distal end retouched/utilized
30	L3	endscraper	KRF	h/t; triangular
31	L3	endscraper	SRC	
32	L3	end/sidescraper	SRC	preform
33	L3	sidescraper	SRC	
34	L3	sidescraper	SRC	
35	L3	spokeshave	SRC	concave sidescraper; wide arc
36	L3	point tip	silicified peat	bifacial
37	L3	point tip	silicified peat	bifacial

Table C.12 Rocky Island (FaNp-7) Tool Analysis continued.

Specimen	Level	Tool	Material	Notes
38	L3	point tip	silicified peat	bifacial
39	L3	chopper	SRC	h/t; lg cobble fragment w/ bifacial retouch
40	L5	sidescraper	agate	bifacial
41	L6	sidescraper	SRC	
42	T1-4	utilized flake	SRC	x2
43	T1-4	utilized flake	SRC	flake fragment /shatter; usewear
44	T1-4	utilized flake	KRF	
45	T1-4	sidescraper	SRC	
46	T4	end/sidescraper	chert	3 sides.
47	T5	biface	silicified peat	fragment
48	T6	endscraper	SRC	coarse; 0-20 cm bs
49	T6	retouched flake	SRC	usewear; secondary flake
50	T6	perforator	SRC	unifacial; utilized
51	T7	perforator	SRC	triangular
52	T7	biface	SRC	utilized :19cm

Abbreviations: KRF = Knife River flint, RMQ = Rocky Mountain Quartzite; SRC = Swan River Chert; lg = large; pos. = possible; h/t = heat-treated

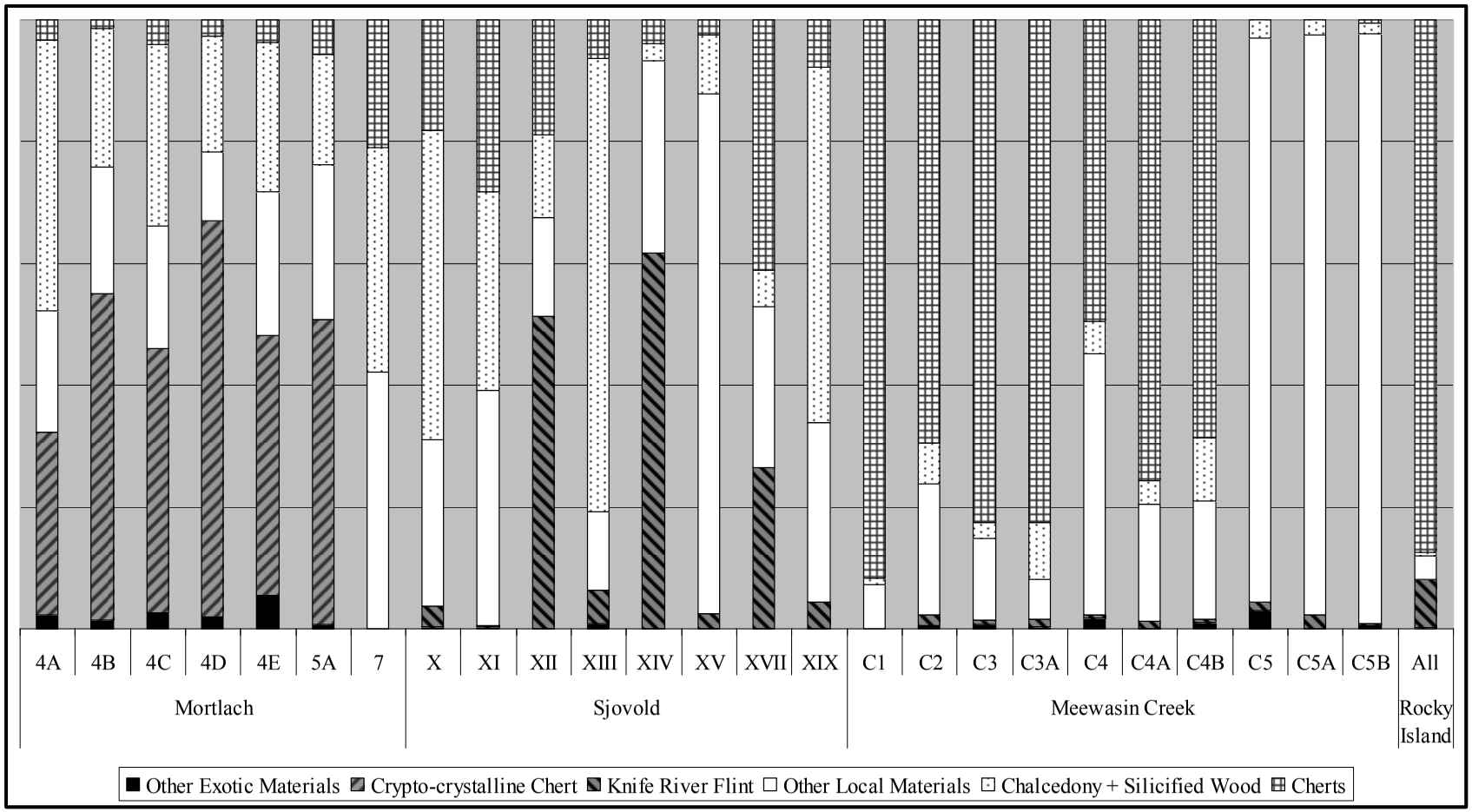

Table C.1 Comparison of Lithic Debitage as a Percentage of Level.

Appendix D: Faunal Analysis

Table D.1 Cultural Level 1 *Bison bison* Element Quantification.

B. bison	**C1 MNE**				
ELEMENTS	**Axial**	**R**	**L**	**NISP**	**MNI**
Skull, zygomatic	-	1	1	3	1
Skull, pre-maxilla	-	1	-	22	1
Skull, maxilla	1	2	1	557	2
Skull, mandible	-	2	2	772	2
Skull, petrous	1	-	-	2	1
Vertebrae, cervical (7)	4	-	-	125	1
Vertebrae, thoracic (13)	2	-	-	106	1
Vertebrae, lumbar (6)	2	-	-	2	1
Vertebrae, sacral (5)	1	-	-	3	1
Ribs	-	1	3	23	1
Scapula	-	-	2	23	2
Humerus	-	3	4	48	4
Radius/Ulna	-	3	2	43	3
Metacarpal	-	-	1	6	1
2 nd/3rd carpal	-	2	-	2	2
Radial carpal	-	1	-	1	1
Ulnar carpal	-	1	1	2	1
Unciform carpal	-	-	1	1	1
Internal carpal	-	2	-	2	2
Innominate	-	1	1	23	1
Femur	-	1	2	38	2
Tibia	-	6	3	48	6
Lateral malleolus	-	6	4	10	6
Metatarsal	-	4	2	30	4
Calcaneus	-	3	2	10	3
Talus	-	5	1	6	5
1st tarsal	-	1	-	1	1
2nd/3rd tarsal	-	5	3	8	5
Central/4th tarsal	-	2	3	6	3
Sesamoid	1	-	-	1	1
1st phalanx (8)	7	-	-	8	1
2nd phalanx (8)	11	-	-	11	2
3rd phalanx (8)	7	-	-	43	1
Unidentified vertebrae	-	-	-	1	-
Unidentified metapodial	-	-	-	28	-

Table D.1 Cultural Level 2 *Bison bison* Element Quantification.

B. bison	**C2 MNE**			**NISP**	**MNI**
ELEMENTS	**Axial**	**R**	**L**		
Skull, pre-maxilla	-	2	-	10	2
Skull, maxilla	-	4	5	298	5
Skull, mandible	-	5	3	291	5
Skull, petrous	-	10	8	27	10
Vertebrae, cervical (7)	6	-	-	106	1
Vertebrae, thoracic (13)	7	-	-	64	1
Vertebrae, lumbar (6)	6	-	-	66	1
Vertebrae, sacral (5)	3	-	-	7	3
Ribs	-	8	5	90	1
Scapula	-	2	1	229	2
Humerus	-	5	5	125	5
Radius/Ulna	-	6	6	545	6
Metacarpal	-	7	8	176	8
5th metacarpal	-	1	-	1	1
$2^{nd}/3^{rd}$ carpal	-	8	6	14	8
Radial carpal	-	8	7	27	8
Ulnar carpal	-	3	4	8	4
Unciform carpal	-	5	2	7	5
Internal carpal	-	6	7	14	7
Accessory carpal	-	2	-	3	2
Innominate	-	3	2	184	3
Femur	-	2	2	52	2
Tibia	-	9	4	277	9
Lateral malleolus	-	7	4	11	7
Patella	-	1	1	2	1
Metatarsal	-	4	8	216	8
Calcaneus	-	9	5	113	9
Talus	-	10	7	25	10
1st tarsal	-	2	-	3	2
$2^{nd}/3^{rd}$ tarsal	-	9	8	17	9
Central/4^{th} tarsal	-	8	6	27	8
Sesamoid	2	-	-	2	1
1st phalanx (8)	40	-	-	123	5
2nd phalanx (8)	32	-	-	45	4
3rd phalanx (8)	7	-	-	12	1

Table D.3 Cultural Level 3 *Bison bison* Element Quantification.

B. bison	C3 MNE				
ELEMENTS	**Axial**	**R**	**L**	**NISP**	**MNI**
Skull, maxilla	-	3	4	284	4
Skull, mandible	-	2	1	367	2
Skull, petrous	-	3	-	7	2
Skull, temporal	2	-	-	2	1
Vertebrae, thoracic (13)	1	-	-	3	1
Scapula	-	1	1	210	1
Humerus	-	1	1	80	1
Radius	-	2	1	96	2
Ulna	-	-	1	38	1
Metacarpal	-	1	1	95	2
2/3rd carpal	-	1	1	2	1
Radial carpal	-	3	-	8	3
Ulnar carpal	-	2	-	2	2
Internal carpal	-	1	-	2	1
Innominate	-	1	1	50	1
Femur	-	1		129	1
Tibia	-	2	2	80	2
Lateral malleolus	-		1	1	1
Metatarsal	-	1	1	23	1
Calcaneus	-	1	1	36	1
Talus	-	4	2	72	4
2nd/3rd tarsal	-	2	2	4	2
Central/4th tarsal	-	2	1	9	2
1st phalanx (8)	2	-	-	18	1
2nd phalanx (8)	3	-	-	3	1
3rd phalanx (8)	1	-	-	1	1

Table D.4 Cultural Level 3A *Bison bison* Element Quantification.

B. bison	C3A MNE			
ELEMENTS	**R**	**L**	**NISP**	**MNI**
Skull, maxilla	1	1	7	1
Skull, mandible	-	1	48	1
Skull, petrous	1	-	11	1
Humerus	1	1	96	1
Metacarpal	1	-	9	1
Talus	1	-	1	1

Table D.5 Cultural Level 4 *Bison bison* Element Quantification.

B. bison	C4 MNE				
ELEMENTS	**Axial**	**R**	**L**	**NISP**	**MNI**
Skull, maxilla		-	1	8	1
Skull, mandible		1	1	145	2
Metacarpal	1	-	-	567	1
Tibia		1	-	46	1
Talus		1	-	5	1

Table D.6 Cultural Level 6 *Bison bison* Element Quantification.

B. bison	C6 MNE				
ELEMENTS	**Axial**	**R**	**L**	**NISP**	**MNI**
Skull, maxilla	1	-	-	17	1
Radius	-	1	1	21	1
Metacarpal	-	1	-	1	1
2/3rd carpal	-	1	-	1	1
Radial carpal	-	1	-	1	1
Unciform carpal	-	1	-	1	1
Internal carpal	-	1	-	1	1
2nd phalanx	1	-	-	1	1
3rd phalanx	1	-	-	1	1

Table D.7 Cultural Level 1 *Lynx lynx* Element Quantification.

Lynx lynx	MNE			
ELEMENTS	**R**	**L**	**NISP**	**MNI**
Teeth, carnassial	0	1	1	1
Teeth, premolar	0	1	1	1
Scapula	1	0	1	1
Humerus	1	0	3	1
Ulna	0	1	1	1
Femur	1	0	2	1
Tibia	0	1	2	1
Metatarsal	2	0	4	1
Calcaneus	1	1	2	1
Talus	0	1	1	1
Navicular tarsal	1	0	1	1
Central/4th tarsal	1	0	1	1
1st phalanx	2	0	4	1
2nd phalanx	2	0	2	1

Appendix E: Pottery Analysis

Table E.1 Pottery Attributes

Level	Cat. #	Type	Exterior Surface	Interior Surface	Weight	Maximum Thickness	Length	Width
C1	5618	rim	smooth/ burnished*	smooth*	.5 g	6.6 mm	15 mm	14 mm
C2	4783	rim	plain/ smooth	smooth	3.5 g	6.7 mm	22 mm	19 mm
C2	4595	body	net-impressed	smooth	2.8 g	6.4 mm	26.5 mm	21 mm
C3	2830	shoulder	smooth	smooth	1.6 g	6.6 mm	20 mm	13 mm
C3	5529	neck/ shoulder	exfoliated*	smooth*	2.3 g	8.2† mm	21 mm	14 mm
C3	1270	body	exfoliated*	smooth*	1.1 g	5.7† mm	16 mm	14 mm
*Surface location is arbitrary; † Indeterminate original thickness								